

APOLLO GUIDANCE & NAVIGATION SYSTEMS INDEX

| <u>Item</u> | <u>Title</u> | <u>Number</u> |
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| 8. | COMPUTER PROGRAM ASSEMBLY | |
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| | B. Artemis | 1021100 |
| | C. Moonglow | 1021101 |
| | D. Sunrise | 1021102 |
| | E. Sunrise | 1021103 |
| | F. Ares | 1021104 |
| | G. B*RLS 202 | 1021105 |
| | H. RLS 202 | 1021106 |
| | I. Retred 44 | 2021100 |
| | J. Aurora | 2021101 |
| | K. Venus | 2021102 |
| | L. Retred 50 | 2021103 |
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| | U. Colossus | 2021111 |
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| | W. Colossus 2 | 2021113 |
| 9. | CONTRACT TECHNICAL SPECIFICATION APOLLO G&N EQUIPMENT | |
| | A. APOLLO Command Module & Associated Equipment - Block I PS1000000 | |
| | B. APOLLO Command Module & Associated Equipment - Block II PS2000000 | |
| | C. Airborne Primary Guidance, Navigation and Control Sub-system - LEM | PS6000000 |
| 10. | A/B G&N EQUIPMENT QUALIFICATION SPECIFICATIONS | |
| | A. Block I and Block I, 100 Series - | ND1002037 |
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| 11. | G&N RETEST SPECIFICATION INDEXES | |
| | A. Command Module - Block I | ND1002362 |
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| | C. LEM | ND1002364 |
| 12. | FLIGHT PROGRAM ASSEMBLY | |
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| | A. Spacecraft 101 | ND1002374 |
| | B. Spacecraft 103 | ND1002389 |
| 14. | PROCESS SPECIFICATION-IRIG and PIP Replacements | ND1002368 |

| PART NO. | INTERNAL THREAD | NEWTON INSERT PART NUMBER | EXTERNAL THREAD | TL MAX | L $\pm .010$ | T $\pm .010$ | TYPE |
|-----------|-----------------|------------------------------|-----------------|-----------|-----------------|-----------------|------|
| 1000115-1 | 2-56UNC-3B | KCL0256 | 8-32UNC-2A | 7/32 | .12 | - | I |
| 1000115-2 | 4-40UNC-3B | KCL0440 | 10-32UNF-2A | 9/32 | .16 | - | I |
| 1000115-3 | 6-32UNC-3B | KCL0632 | 12-28UNF-2A | 5/16 | .18 | .13 | II |
| 1000115-4 | 2-56UNC-3B | KCL0256 | 6-32UNC-2AMOD | 7/32 | .10 | - | I |
| 1000115-5 | 8-32UNC-3B | KCL0832 | 1/4-28UNF-2AMOD | 11/32 | .18 | .13 | II |

| REVISIONS | | | | TDRR 00105 | |
|-----------|------|---|---------|--------------|------------------|
| SYM | ZONE | DESCRIPTION | CHG NO. | DATE | APPD. |
| D | | REPLACES REV "C" WITHOUT CHANGE PER TDRR 30732 | | 18 JUL 66 | WJY <i>EW</i> |

REQUIREMENTS:

1. GENERAL

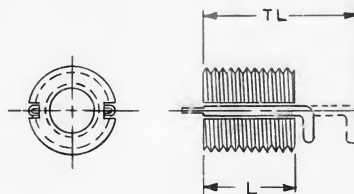
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
- SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND1015404 CLASS 3
- MARKING: IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NO., REV LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.

2. INSPECTION AND ACCEPTANCE:

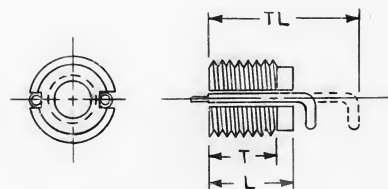
- DIMENSIONS AS SHOWN.

3. DESIGN REQUIREMENTS:

- MATERIAL: CORROSION RESISTANT STEEL PER MIL-S-7720, CLASS 303, CONDITION B.
(1) FINISH: PASSIVATE PER MIL-S-5002.
- INTERNAL THREADS TO CONFORM TO MIL-S-7742.
- LOCKING TORQUE PER MIL-N-25027.
- DRY FILM LUBRICANT PER MIL-L-8937, FORM A



TYPE I



TYPE II

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | | | | | | | |
|-------------------|--|---|--|--|--|---|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | MIT INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| | | FRACTIONS DECIMALS ANGLES | | DWS NO CONTRACT | | | |
| | | + - - + - - + - | | DRAWN R.G.S DATE | | INSERT, THREADED SELF LOCKING | |
| | | DO NOT SCALE THIS DRAWING | | CHECKED | | SPECIFICATION CONTROL DRAWING | |
| | | MATERIAL | | APPROVAL AJ Boyce 21 JUN 62 | | | |
| MULTIPLE | | | | APPROVAL | | | |
| USAGE DL1000001 | | | | JACK BARNARD 11/21/62 | | CODE IDENT NO. SIZE | |
| NEXT ASSY USED ON | | | | NASA APPROVAL | | C 1000115 | |
| APPLICATION | | CONTRACT NAS 9-153 | | MIT APPROVAL W. KUPFER 21 JUN 62 | | SCALE | |
| | | | | | | SHEET 1 OF 1 | |

NASA Apollo G&N Specification
 ND 1002002
 Class A Release
 TDRR No. 00709
 3 April 1963
 REV B PER TDRR 08773
 26 May 1964

PROCESS FOR ENCAPSULATING
 FILLING AND MOLDING WITH
 POLYURETHANE FOAM

Pages Revised

| Revision Letter | TDRR # | Pages Revised | Approvals | | Date |
|-----------------|--------|--|------------|------------|----------|
| | | | MIT | NASA | |
| A | 07642 | 1, 2, 3, 4, Page i, Add Pages 4 - 8 inc. | <i>WLC</i> | <i>KM</i> | 4/14/64 |
| B | 08773 | 1, 4, 6 | <i>WLC</i> | <i>WJR</i> | 6/2/64 |
| C | 12923 | All pages | <i>WLC</i> | <i>WJR</i> | 4 Nov 64 |
| D | 18786 | i, 1, 2, 3, 9, 10, 11, 12, 13, through 16 | <i>WLC</i> | <i>WJR</i> | 5/18/65 |
| | | | | | |

This specification consists of pages i to iii and 1 to 16 inclusive.

2 APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to extent specified herein.

Standards

American Society for Testing and Materials

D-1622 Method of Test for Apparent Density of Rigid Cellular Plastics.

D-1564 Specifications and Methods of Test for Flexible Urethane Foam.

PUBLICATIONS

NASA-

NPC 200-2

NASA Quality Publication, Quality Program
Provisions for Space System Contractors.

SPECIFICATIONS

Federal -

TT-M-261

Methyl - Ethyl-Ketone

Military -

MIL-S-21568 Silicone Fluid, Dimethyl Polysiloxane

Drawings

SCD 1006281
SCD 1010798
SCD 1006276
SCD 1010863
SCD 1010864
SCD 1010865
SCD 1010866

Resin, Urethane Foam
Foam, Polyurethane
Pigment, Black
Polyurethane Resin
Polyurethane Prepolymer
Polyurethane Prepolymer
Catalyst

3. MATERIALS AND EQUIPMENT

- 3.1 Six pound foam system per Dwg. 1006281
- 3.2 Eight pound foam system per Dwg. 1010798.
- 3.3 Black pigment per Dwg. 1006276.

Resin per Dwg. 1010798-1 47.6 grams \pm 1%

Activator per Dwg. 1010798-2 52.4 grams \pm 1%

If smaller batches are to be mixed, the above weights are to be used as ratios. The same is true if larger batches are desired.

5.2.6 Components or assemblies to be encapsulated shall be placed in the cleaned, waxed, molds. The molds with the items to be encapsulated are then placed in an oven set for 138 degrees \pm 5^oF and allowed to remain therein for 30 minutes minimum.

5.2.7 The materials shall be mixed in the ratios specified in paragraph 5.2.5 at mixing speeds between 5000 and 10,000 rpm. The mixed foam shall be poured as evenly as possible across the surface of the mold in the pre-heated mold.

5.2.8 Curing Cycle #1 for 8 Pound Foam

5.2.8.1 This method of curing shall be used for items to be encapsulated that do not contain heat sensitive components.

5.2.8.2 Close the mold by placing the cover in place and securing it. Place the closed mold on a work bench and allow to remain for five (5) minutes minimum.

5.2.8.3 Place the mold in the 175^oF \pm 5^oF oven and allow to remain for 1 1/2 hours minimum.

5.2.8.4 After the allotted time has passed, remove the mold from the oven, and allow to cool until it reaches 100^oF or less.

5.2.8.5 Using the plastic headed mallet and mold jack screws, if any, loosen the removable sections of the mold so that the encapsulated item may be removed.

5.2.9 Curing Cycle #2 for 8 Pound Foam

5.2.9.1 This method of curing shall be used for items to be encapsulated that contain heat sensitive components (such as polystyrene capacitors, etc.).

5.2.9.2 Close the mold by placing the cover in place and securing it. Place the closed mold on a work bench and allow it to remain for five (5) minutes minimum.

5.2.9.3 Place the mold in the $138^{\circ}\text{F} \pm 5^{\circ}\text{F}$ oven and allow to remain for 3 1/2 hours minimum.

5.2.9.4 After the allotted time has passed remove the mold from the oven, and allow to cool until it reaches 100°F , or less.

5.2.9.5 Using the plastic headed mallet and mold jack screws, if any, loosen the removable sections of the mold so that the encapsulated item may be removed.

6. PROCEDURE - Foam System C

6.1 Daily Set-up Check

6.1.1 At the start of each 24 hour production period, a check of the materials shall be made regarding their ability to properly encapsulate. This shall be done in the following manner:

6.1.2 The materials shall be mixed as specified in Paragraph 6.2.6.

6.1.3 Test Method A for 2 Pound Foam -

Ten (10) grams \pm 0 grams -0.5 gram of the mixed foam shall be poured into an eight ounce unwaxed paper cup. The activated material shall remain stationary until the foam has hardened, (about 20 minutes).

6.1.4 After the foam has hardened, the height of the foam shall be compared against the height of a standard, made in the same manner, from materials taken from freshly opened containers newly received in-house. Such a standard shall be made for each lot of material. After the lot has been used up, the standard shall be discarded and a new one made for the next lot. The height of the sample shall be equal to the height of the standard with a tolerance of $\pm 3\%$
- 10%

6.1.5 Alternate Test Method B for 2 Pound Foam -

Density at room ambient shall be 1.95 to 2.15 pounds per cubic foot when tested as follows:

APOLLO
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ND 1002002
REV D

Test specimens shall be prepared by combining the material at room temperature per Paragraph 6.2.6, introducing 20 ± 2 grams of this material into a paper container with dimensions of $3 \pm 1/2$ " diameter and $3-1/4$ inches minimum in height and allowing the sample to free blow and cure for a minimum of one hour at room temperature of $1/2$ hour at $+150^\circ \pm 5^\circ\text{F}$. After the cure is completed, a sample of the foam shall be cut using the coring tool to a size convenient for measurement and examination. All skin shall be removed. The volume of this sample shall be a minimum of $1-1/2$ cubic inches. The density of the specimen shall be determined in accordance with ASTM D-1622. The cured sample shall be uniform in color, shall exhibit no excessive voids and shall have a uniform cell structure, the foam surface shall be firm and tack free and shall not be firable.

6.1.6 If the sample does not meet the requirements of 6.1.4 or 6.1.5, whichever is used, the parent batch of materials used to make the sample shall not be used.

6.2 Production Procedure for Foam System C (2 Pound Foam)

6.2.1 Cleaning - Restraining molds shall be disassembled and thoroughly cleaned using methyl ethyl ketone and a clean lint free cloth.

6.2.2 Coating - All restraining mold surfaces which contact the foam shall be coated with a fluorocarbon base mold release or coated and polished with one coat of auto paste wax.

6.2.3 Cleaning of structural Members - The interior of structural members shall be thoroughly cleaned to obtain optimum adhesion of foam.

6.2.4 Preheating - The restraining mold containing the cleaned structural member to be filled with foam shall be preheated at $+130^\circ \pm 5^\circ\text{F}$ for $1/2$ hour minimum prior to foaming.

6.2.5 Method for Determining Amount of Foam Required

The amount of foam required is determined by the volume (cu. in.) to be filled and the density range (pounds per cubic foot) specified by the detail drawing. The minimum total weight (grams) of the foam ingredients may be determined by multiplying the specified minimum density (lbs/cu. ft.) by the total volume of the cavity to be filled (cu. in.) and by the factor 0.263. The maximum weight of foam ingredients may be determined similarly using the maximum specified density.

If no density range is specified, the maximum total weight of foam ingredients (grams) shall equal 0.95 times the volume (cu. in.) of the cavity to be filled. The minimum total weight of the ingredients required shall be such that the Quality Assurance requirements of this specification are achieved.

6.2.6 Mixing of 2 lb/cu. ft. System - Once the total weight of the foam to be used has been calculated, the components shall be combined in the weights specified or in proportionate ratios when larger or smaller batches are required. The following weights or ratios shall be used:

| | |
|--|--------------------|
| Polyurethane Prepolymer per Drawing 1010864 | 145 grams \pm 1% |
| Polyurethane Resin per Drawing 1010863 | 100 grams \pm 1% |

6.2.7 Filling - After mixing as specified in Paragraph 4.2, the foam shall be immediately poured into the preheated structural member mounted within the restraining mold.

6.2.8 Curing Cycle for 2 Pound Foam - The freshly poured foam shall be cured ~~in an~~ oven set at $+180^{\circ} \pm 5^{\circ}\text{F}$ for 1 hour minimum.

6.2.9 Removal of Structural Member - After the cure cycle is complete and the part has cooled to below 100°F . The structural member shall be removed from the mold. Excess foam shall be removed from the filling ports to present a surface flush with the structural member.

7. PROCEDURE - Foam System D

7.1 Daily set-Up Check

7.1.1 At the start of each 24 hour production period a check of the materials shall be made regarding their ability to properly encapsulate. This shall be done in the following manner:

8.6 There shall be no exposed parts, components, leads, or buss wires.

8.7 There shall be no visible component parts or components.

9. NOTES

9.1 Intended Use. The intent of potting or encapsulating with polyurethane foam is to provide a lightweight insulating material which will maintain the spatial relationship between components when such modules are subject to conditions of vibration, shock, and acceleration. Rigid polyurethane foams are also intended for use in providing rigidity to hollow structural members. Flexible polyurethane molded parts are intended for use as thermal insulation.

9.2 This document describes processes for producing rigid and flexible polyurethane foams from liquid components.

9.3 Rigid foam-in-place polyurethane foam as covered by this specification, is produced from the reaction of a polyester resin and a di-isocyanate prepolymer. The flexible foam in-place polyurethane foam covered by this specification is produced from the reaction of a di-isocyanate prepolymer and a catalyst. A silicone oil is added to the prepolymer to modify the resultant cell structure.

NASA Apollo G&N Specification
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PROCESS FOR ENCAPSULATING
 FILLING AND MOLDING WITH
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Pages Revised

| Revision Letter | TDRR # | Pages Revised | Approvals | | Date |
|-----------------|--------|--|------------|------------|----------|
| | | | MIT | NASA | |
| A | 07642 | 1, 2, 3, 4, Page i, Add Pages 4 - 8 inc. | <i>WLR</i> | <i>WLR</i> | 4/14/64 |
| B | 08773 | 1, 4, 6 | <i>WLR</i> | <i>WLR</i> | 6/2/64 |
| C | 12923 | All pages | <i>WLR</i> | <i>WLR</i> | 4 Nov 64 |
| D | 18786 | 1, 1, 2, 3, 9, 10, 11, 12, 13, through 16 | <i>WLR</i> | <i>WLR</i> | 5/18/65 |
| E | 22321 | 16, 2 | <i>WLR</i> | C. METZGER | 8/65 |

This specification consists of pages i to iii and 1 to 16 inclusive.

- 8.6 There shall be no exposed parts, components, leads, or buss wires
- 8.7 There shall be no visible component parts or components.
- 8.8 The foam shall adhere to the metal substrate. Areas that exhibit lack of adherence between the foam and metal substrate may be repaired in accordance with ND 1002235 Method C. Other foam surface defects may be repaired per ND 1002235 Method A and/or B.
9. Notes
- 9.1 Intended Use. The intent of potting or encapsulating with polyurethane foam is to provide a lightweight insulating material which will maintain the spatial relationship between components when such modules are subject to conditions of vibration, shock, and acceleration. Rigid polyurethane foams are also intended for use in providing rigidity to hollow structural members. Flexible polyurethane molded parts are intended for use as thermal insulation.
- 9.2 This document describes process for producing rigid and flexible polyurethane foams from liquid components.
- 9.3 Rigid foam-in-place polyurethane foam as covered by this specification, is produced from the reaction of a polyester resin and a di-isocyanate prepolymer. The flexible foam in-place polyurethane foam covered by this specification is produced from the reaction of a di-isocyanate prepolymer and a catalyst. A silicone oil is added to the prepolymer to modify the resultant cell structure.

PROCESS FOR ENCAPSULATING
WITH
POLYURETHANE FOAM

Pages Revised

| Revision Letter | TDRR # | Pages Revised | Approvals | |
|--------------------|--------|---------------|-----------|------|
| | | | MIT | NASA |
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| | | | | |

This specification consists of pages i to iii and I to 4 inclusive.

NASA DOCUMENT 1002002
PROCESS FOR ENCAPSULATING WITH POLYURETHANE FOAM

The purpose of this document is to provide a process for foam
potting or foam encapsulating electronic units or equipments.

MIT Instrumentation Laboratory

W. Kupper 3 Apr 63 (Signed)
Date

NASA/MSC ASPO Approval

John Bernard 4/3/63 (Signed)
Date

PROCESS FOR ENCAPSULATING WITH POLYURETHANE FOAM

1. INTRODUCTION

1.1 Scope. This procedure provides a process for foam potting or foam
encapsulating electronic units or equipment.

1.2 Health and Safety. For the plastic procedures contained herein adequate
ventilation should be provided. Avoid skin contact with uncured plastic materials;
if contact occurs take the necessary measure specified by the manufacturer.

2. MATERIAL AND EQUIPMENT

2.1 Liquid diisocyanate, Nopco G508-T or equivalent, see Section 5.4.

2.2 Liquid polyester resin base, Nopco G508-R or equivalent, see Section 5.4.

2.3 Methyl ethyl ketone (MEK).

2.4 Acetone.

2.5 Silicone oil mold release.

2.6 Nitric acid, concentrated.

2.7 Wax paste mold release.

2.8 Black pigment dispersed in polyester resin.

2.9 Molds. Casting molds which will give the desired shape and dimensions to
the encapsulation. These molds should have adequate draft and a high interior polish
with a capacity to withstand the expansion of the casting material. Molds for poly-
urethane foam should be vented and still provide a degree of restraint.

2.10 Hot air oven capable of maintaining a temperature of 65 ± 5°C.

3. PROCEDURE

3.1 Mold preparation, cleaning.

APOLLO G&N Specification
 ND1002004 REV M
 Original Issue Date:
 Release Authority: TDRR 00630
 Class A Release

PROCESS SPECIFICATION

EPOXY BONDING OF METALLIC AND NONMETALLIC MATERIALS

Record of Revisions

| Date | Revision Letter | TDRR No. | Pages Revised | Approvals | |
|--------|-----------------|----------|------------------------------------|-----------|------|
| | | | | TACT | NASA |
| 2/9/67 | M | 32935 | All except ii and iii <i>EDG/m</i> | MGM EA | -- |
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This specification consists of page i to iii and 1 to 6 inclusive.

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|-----------|---------------------------|-----------|-------------------|-------------|-----------------|
| APPROVALS | William J | I. Halzel | G. Mayo | S. D. Smith | R. O. Trummer |
| | Rhine 12/3/63 NASA/MSC | 12/3/63 | 12/2/63 MIT/IL | 11/29/63 | 14 Nov 63 AC |

1. SCOPE

1.1 PURPOSE. This specification establishes the requirements for the bonding of metals, ceramics, glass and plastics to each other or in combination with each other using epoxy adhesive.

1.2 CLASSIFICATION. The adhesives used in the process covered by this specification shall be classified as follows:

- a. Type I: Consisting of an epoxy resin and a curing agent covered by Drawing 1010682 and Drawing 1010683, respectively.
- b. Type II: Consisting of an epoxy resin and a curing agent covered by Drawing 1010657, and Drawing 1010686, respectively.
- c. Type III: Consisting of an epoxy resin compound and curing agent covered by Drawing 1010716 and 1010304, respectively.
- d. Type IV: Consisting of an epoxy resin and a curing agent covered by Drawing 1006284 and Drawing 1006285 respectively.
- e. Type V: Consisting of an epoxy resin and a curing agent covered by Drawing 1006286 and Drawing 1006287 respectively.
- f. Type VI: Consisting of an epoxy resin, a curing agent, and a silicon dioxide filler covered by Drawings 1006284, 1006285, and 1006277 respectively.
- g. Type VII: Consisting of an epoxy resin and a curing agent covered by Drawing 1012533 and Drawing 1010304 respectively.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

DRAWINGS

APOLLO G&N

| | |
|---------|-----------------|
| 1006277 | Silicon Dioxide |
| 1010657 | Epoxy Resin |

APOLLO G&N Specification
ND1002004 REV M

| | |
|---------|---------------------|
| 1006284 | Epoxy Resin |
| 1010682 | Epoxy Resin |
| 1006286 | Epoxy Resin |
| 1010683 | Curing Agent, Amine |
| 1006285 | Curing Agent |
| 1010686 | Catalyst |
| 1006287 | Curing Agent |
| 1010716 | Epoxy Resin |
| 1010304 | Curing Agent, Amine |

PUBLICATIONS

National Aeronautics and Space Administration

NPC 200-2

NASA Quality Publication, Quality Program
Provisions for Space System Contractors

3. REQUIREMENTS

3.1 MATERIAL. The adhesive to be used in the process covered by this specification shall be as specified in Table I.

TABLE I
ADHESIVE COMPOSITION

| ADHESIVE | COMPOSITION (pbw) | | | AVERAGE ROOM TEMPERATURE POT LIFE |
|------------------|-------------------|------------|----------|--------------------------------------|
| | RIGID | SEMI-RIGID | FLEXIBLE | |
| <u>Type I</u> | | | | |
| Resin | 100±1% | -- | -- | 90 min |
| Curing Agent | 32±3% | -- | -- | |
| <u>Type II</u> | | | | |
| Resin | 100±1% | 100±1% | 100±1% | 2-3 Hours |
| Curing Agent | 100±2% | 200±1% | 300±1% | |
| <u>Type III</u> | | | | |
| Resin | 100±1% | -- | -- | 45 minutes |
| Curing Agent | 3 to 4 | -- | -- | |
| <u>Type IV</u> | | | | |
| Resin | 100±1% | -- | -- | 20 minutes |
| Curing Agent | 25±3% | -- | -- | |
| <u>Type V</u> | | | | |
| Resin | 100±1% | -- | -- | 1/2 to 1 1/2 Minutes |
| Curing Agent | 50±2% | -- | -- | |
| <u>Type VI</u> | | | | |
| Resin | 100±1% | -- | -- | 20 Minutes |
| Curing Agent | 25±3% | -- | -- | |
| Silicone Dioxide | 0.5 to 6 | -- | -- | |
| <u>Type VII</u> | | | | |
| Resin | 100±1% | -- | -- | 30 minutes |
| Curing Agent | 12.5±5% | -- | -- | |

3.2 SURFACE PREPARATION

3.2.1 Roughening. Prior to cleaning, the surfaces to be bonded shall be roughened where applicable with No. 180 emery cloth or sandpaper, or equivalent.

3.2.2 Surfaces to be bonded shall be clean and free of grease, oil, dirt, or other contamination which might adversely effect bond strength.

3.3 MIXING. The adhesive shall be mixed in the proportions shown in Table I. The ingredients shall be thoroughly mixed to insure complete homogeneity of the mixture.

3.3.1 Pot Life. After mixing, the adhesives shall be used within the time period specified in Table I unless they are stored in a frozen state as specified in 3.3.2.

3.3.2 Frozen Storage. Types I, II and III adhesives may be stored in the frozen state, provided the following conditions are met:

- a. The adhesive shall be placed in small air-tight containers immediately after mixing and degassing.
- b. The size of containers to be used shall be determined by the quantity of adhesive normally used during the pot life specified in Table I.
- c. The containers shall be marked by means of a tag, label or color code to indicate the date of mixing or expiration date, and to identify the adhesive.
- d. The closed containers with the mixed adhesive shall be placed in a freezing compartment at a temperature of -40°F or lower.
- e. The frozen adhesive shall be warmed to room temperature before opening the container to prevent the condensation of moisture on the adhesive.
- f. The frozen adhesive shall be used within one month after the date of mixing and freezing. All frozen adhesive remaining after one month from the date of mixing shall be discarded.

3.4 APPLICATION. The adhesive shall be applied uniformly to one or both surfaces to be bonded. The parts shall then be mated and gently pressed together, and an uninterrupted glue line shall be achieved. Excess adhesive shall be removed using a suitable solvent and/or mechanical means.

3.5 CURING. After application of the adhesive, contact pressure shall be exerted on the assembly, when configuration permits, and the assembly cured in accordance with Table II. High temperature curing shall not be used for materials which would be detrimentally affected by high temperatures.

TABLE II
CURE REQUIREMENTS

| ADHESIVE | CURE REQUIREMENTS | |
|----------|-------------------|-----------------------------|
| | Time (minimum) | Temperature |
| Type I | 10 minutes | 255°F ±5°F (121°C to 127°C) |
| | 15 minutes | 205°F ±5°F (93°C to 99°C) |
| | 25-30 minutes | 190°F ±5°F (85°C to 91°C) |
| | 60 minutes | 158°F ±5°F (67°C to 73°C) |
| | 120 minutes | 105°F ±5°F (38°C to 44°C) |
| | 40 minutes | 180° ±5°F |
| | 90 minutes | 135° ±5°F |
| | 24 hours | Room Temp |
| Type II | 15 minutes | 225°F ±5°F (104°C to 110°C) |
| | 1 hour | 158°F ±5°F (67°C to 73°C) |
| | 8 hrs. min | Room Temp |
| | 2 3/4 hrs | 135° ±5°F |
| Type III | 4 hours | Room Temp |
| | 1 hour | 158°F ±5°F (67°C to 73°C) |
| | 5 minutes | 225°F ±5°F (121°C to 127°C) |
| Type IV | 30 minutes | 158°F ±5°F (67°C to 73°C) |
| | *4 hours | Room Temp |
| Type V | *5 minutes | Room Temp |
| Type VI | 30 minutes | 158°F ±5°F (67°C to 73°C) |
| | *4 hours | Room Temp |
| Type VII | 15 minutes | 225°F ±5°F (104°C to 110°C) |
| | 30 minutes | 158°F ±5°F (67°C to 73°C) |
| | 8 hrs. min | Room Temp |

*Optimum properties obtained after room temp. Cure of 48 Hrs. Do not perform any bond strength test until a 48 hr. cure at room temperature is completed.

3.6 APPEARANCE. Bonded assemblies shall show complete adhesion in the bonded areas, ~~there shall~~ be no flaws or indication of lack of adhesion in the bonded areas. All excess adhesive shall be removed from the edges of the bond except where such excess is permitted by the contract or applicable drawing. The parts shall not exhibit improper positioning or alignment.

3.7 WORKMANSHIP. The process covered by this specification shall be performed in accordance with the requirements of this specification.

4. QUALITY ASSURANCE PROVISIONS

4.1 PROCESS AND QUALITY CONTROL. The processor shall maintain sufficient process and quality control to assure that the requirements of this specification are met in accordance with the provisions of Publication NPC 200-2.

5. PREPARATION FOR DELIVERY. This section is not applicable to this specification.

6. NOTES

6.1 INTENDED USE. This process is intended for use for bonding combinations of metals, ceramics, glass and plastic materials used in APOLLO Guidance and Navigation equipment.

6.2 CAUTION. Acetone should not be used for cleaning Lexan materials; methyl alcohol should be used.

JHH:jlS

PROCESS FOR
EPOXY BONDING COMBINATIONS OF METALLIC
AND
NONMETALLIC MATERIALS

Record of Revisions

| Rev Letter | Pages Revised | TDRR Number and Date | Approval | |
|---------------|------------------|-------------------------|----------|----------|
| | | | MIT | NASA/MSO |
| | | | | |
| | | | | |
| | | | | |

This document consists of pages i to iii and 1 to 2 inclusive.

This document delineates a procedure to be used on Apollo G and N equipment.

MIT Instrumentation Laboratory

W. A. Ruffner 20 March 1963
Date

NASA/MSO ASPO Approval

B. Michaels 3/20/63
Date

ii

PROCESS FOR
EPOXY BONDING COMBINATIONS OF METALLIC
AND
NONMETALLIC MATERIALS

TABLE OF CONTENTS

| Section | Title | Page |
|---------|-------------------------|------|
| 1. | Scope | 1 |
| 2. | Materials and Equipment | 1 |
| 3. | Procedure | 1 |
| 4. | Inspection | 2 |

1. SCOPE

1.1 Scope. This publication delineates a procedure for bonding between metals, ceramics, glass, and plastics.

2. MATERIALS AND EQUIPMENT

2.1 Epoxy Resin. Rubber and Asbestos Corp. "Bondmaster M688" or equivalent.

2.2 Curing agent for epoxy resin, Rubber and Asbestos Corp. "Hardener M688" or equivalent.

2.3 Acetone, technical grade.

2.4 Suitable clamping device for exerting pressure on bonds.

3. PROCEDURE

3.1 Preparation of surfaces to be bonded.

3.1.1 Roughen the surfaces to be bonded with No. 180 emery cloth or sandpaper.

3.1.2 Thoroughly clean the roughened surface with acetone or a similar cleaning solvent.

3.2 Preparation of Adhesive.

3.2.1 Mix the following materials thoroughly. Mix enough for the job in the following by weight proportions. Mix in a disposable container.

100 parts epoxy resin
32 parts curing agent

Pot life of resin mixture at room temperature: approximately 90 minutes

3.2.2 Evacuate the mixture to at least 27 inches of mercury for a minimum of five (5) minutes until all of the entrapped air is removed.

3.3 Bonding Procedure.

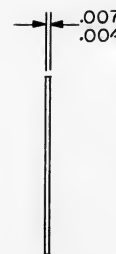
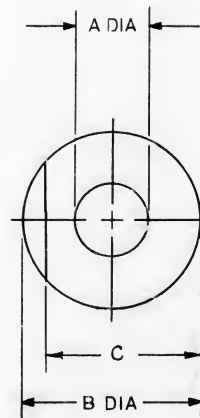
3.3.1 Prefit parts wherever possible. Try to effect good contact between the surfaces to be bonded.

NOTICE: - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFIRMING ANY RIGHT OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1008024 B

REVISIONS 1008024 15

| SYM | DESCRIPTION | DATE | APPROVAL |
|-----|------------------------|-----------|----------|
| A | REVISED PER TDRR 19008 | 14 MAY 65 | A.N. EF |
| B | REVISED PER TDRR 21559 | 20 OCT 65 | JWP CF |



| DASH NO | A DIA | B DIA | C |
|---------|--------------|----------------|--------------|
| -1 | .193 .203 | .520 .510 | — |
| -2 | .193 .203 | .610 .600 | — |
| -3 | .257 .266 | .810 .800 | — |
| -4 | .257 .266 | .593 .583 | — |
| -5 | .321 .328 | 1.055 1.045 | — |
| -6 | .321 .328 | .680 .670 | — |
| -7 | .143 .147 | .450 .440 | — |
| -8 | .257 .266 | .593 .583 | .555 .545 |

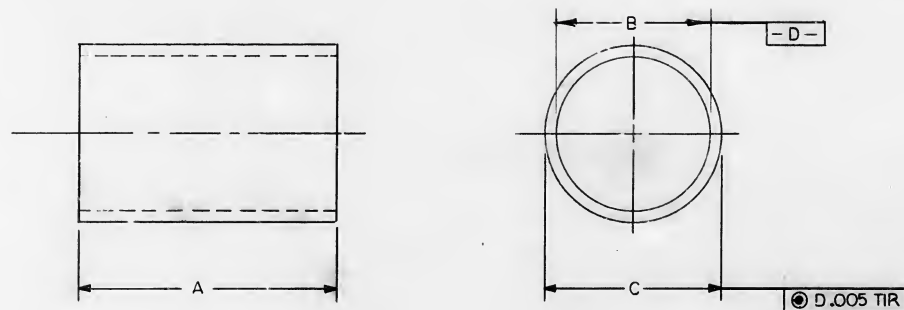
NOTES:-

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MICA, NATURAL MUSCOVITE; ALT HH-1-536, TYPE NMGS, GRADE 4

| | | | |
|--|-------------------------|--|---------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OF DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>W.C. Moore</i> DATE <i>1-9-63</i> CHECKED <i>W.C. Moore</i> DATE <i>7-16-63</i> APPROVAL <i>W.C. Moore</i> DATE <i>2-9-63</i> APPROVAL | | WASHER INSULATOR | |
| NASA APPROVAL <i>W.C. Moore</i> DATE <i>1-9-63</i> | | CODE IDENT NO. 80230 | SIZE C |
| MIT APPROVAL <i>W.C. Moore</i> DATE <i>1-9-63</i> | | SCALE 4/1 | WT |
| APPLICATION | | NASA DRAWING NO. 1008024 | |
| NEXT ASSY | | SHEET 1 OF 1 | |

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| DASH NO. | A DIM. | B DIA | C DIA |
|----------|--------------|--------------|--------------|
| -1 | .255 .245 | .196 .201 | .267 .257 |
| -2 | .333 .323 | .336 .341 | .400 .390 |
| -3 | .420 .410 | .343 .348 | .400 .390 |
| -4 | .250 .260 | .336 .341 | .400 .390 |
| -5 | .130 .120 | .196 .201 | .267 .257 |
| -6 | .195 .185 | .196 .201 | .267 .257 |



NOTES-

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: CERAMIC PER MIL-I-10 GRADE L624T
3. 125/ ALL OVER
4. BREAK SHARP EDGES .010 R MAX

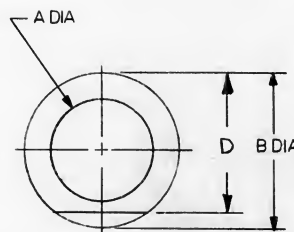
| REVISIONS 00570 | | | |
|-----------------|--|-----------|------------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| A | REVISED PER TDRR 01406 | 5-29-63 | WK |
| B | REVISED PER TDRR 01600 | 6-19-63 | JJA WK |
| C | UP GRADED TO CLASS A WITH- OUT CHANGES PER TDRR 02850 | 8-28-63 | RPF |
| D | REVISED PER TDRR 17184 | 12 MAR 65 | JHA |
| E | REVISED PER TDRR 27812 | 11 APR 66 | RPF J.E.G. |

| | | | |
|--|-------------------------|--|----------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DWG. NO. 1008025 | | DATE 1/9/63 | |
| DRAWN L. S. S. S. | | CHECKED R. P. S. S. | |
| APPROVAL J. P. S. S. | | APPROVAL J. P. S. S. | |
| NASA APPROVAL J. P. S. S. | | CODE IDENT NO. 80230 | |
| MIT APPROVAL J. P. S. S. | | SIZE C | |
| APPLICATION | | SCALE NONE | |
| NEXT ASSY USED ON | | WT | |
| HEAT TREATMENT NONE | | SHEET 1 OF 1 | |
| FINAL FINISH NONE | | | |

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1208001

| REVISIONS TO DR 01451 | | | |
|-----------------------|-----------------------|-----------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| A | REVISED PER TDR 17987 | 6 APR 65 | JHR |
| B | REVISED PER TDR 19009 | 14 MAY 65 | A.N. |
| C | REVISED PER TDR 21559 | 18 OCT 65 | JWP |



| PART NO | A DIA | B DIA | C | D |
|-----------|-------|-------|------|------|
| 1008071-1 | .150 | .250 | .032 | — |
| 1008071-2 | .196 | .500 | .032 | — |
| 1008071-3 | .257 | .625 | .032 | — |
| 1008071-4 | .196 | .438 | .032 | — |
| 1008071-5 | .257 | .562 | .032 | — |
| 1008071-6 | .257 | .613 | .032 | — |
| 1008071-7 | .323 | .625 | .032 | — |
| 1008071-8 | .257 | .562 | .032 | .510 |

NOTES:-

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL:- COPPER / QQ-C-576 SOFT-ANNEALED
3. FINISH: GOLD PLATE PER MIL-G-45204 TYPE II 200.11 INCHES MIN
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015

| | | | |
|-------------|--|---|--------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| | | LIST OF MATERIALS | |
| | MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. DWE. NO. CONTRACT | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| | DRAWN <i>Lowry</i> DATE <i>6-15-63</i> CHECKED <i>R. P. [unclear]</i> DATE <i>7-2-63</i> APPROVAL <i>[signature]</i> APPROVAL <i>[signature]</i> DATE <i>7-2-63</i> | WASHER, FLAT | |
| | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± .005 DO NOT SCALE THIS DRAWING MATERIAL SEE NOTE 2 | CODE IDENT NO. SIZE NASA DRAWING NO. 80230 C 1008071 | |
| | HEAT TREATMENT FINAL FINISH SEE NOTE 3 | NASA APPROVAL <i>[signature]</i> MIT APPROVAL <i>[signature]</i> | |
| NEXT ASSY | USED ON | SCALE NONE WT | SHEET 1 OF 1 |
| APPLICATION | | | |

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6088001

| REVISIONS | | | |
|-----------|-------------------------------------|-------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| | INITIAL RELEASE CLASS A PER TDRR | 22037 | 8-31-65 |

REQUIREMENTS:

1. GENERAL:

- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
- EACH SHIPPING AND UNIT CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME, NASA DRAWING NUMBER, NET CONTENTS, LOT NUMBER AND DATE OF MANUFACTURE. INDIVIDUAL CONTAINERS SHALL ALSO BE MARKED PART A (EPOXY RESIN COMPONENT) OR PART B (CATALYST COMPONENT) WHICHEVER IS APPLICABLE, AND INSTRUCTIONS FOR USE IN ACCORDANCE WITH MIL-P-22808.

2. ACCEPTANCE AND INSPECTION:

- MATERIAL: THE MATERIAL COVERED BY THIS SPECIFICATION SHALL BE A TWO COMPONENT EPOXY PAINT MEETING THE QUANTITATIVE AND QUALITATIVE REQUIREMENTS OF MIL-P-22808 EXCEPT AS REQUIRED TO MEET THE REQUIREMENTS SPECIFIED HEREIN.

(1) PART A

- EPOXY RESIN COMPONENT: THE EPOXY RESIN COMPONENT SHALL CONSIST OF A BISPHENOL TYPE EPOXY RESIN COMBINED WITH THE AMOUNTS OF FLOW CONTROL AGENTS AND VOLATILE SOLVENTS NECESSARY TO MEET THE REQUIREMENTS OF THIS SPECIFICATION.
- PIGMENT: PIGMENTATION SHALL BE AS SPECIFIED IN MIL-P-22808 EXCEPT FOR THOSE COLORS NOT SPECIFIED THEREIN.

(2) PART B

- CATALYST COMPONENT: THE CATALYST COMPONENT SHALL CONSIST OF A POLYAMIDE RESIN COMBINED WITH THE AMOUNTS OF VOLATILE SOLVENTS NECESSARY TO MEET THE REQUIREMENTS OF THIS SPECIFICATION.
- COLOR: WHEN MIXED IN A RATIO OF TWO PARTS BY VOLUME, PART A, TO ONE PART BY VOLUME, PART B, THE MATERIAL SHALL CURE TO THE COLOR AND SPECULAR GLOSS SPECIFIED IN TABLE I. TESTS SHALL BE CONDUCTED IN ACCORDANCE WITH FEDERAL TEST METHOD STANDARD NO. 141, METHODS 4250 AND 6101, RESPECTIVELY.
 - MIXED PAINT: THE MIXED PAINT SHALL CONFORM TO THE QUANTITATIVE REQUIREMENTS SPECIFIED IN MIL-P-22808 EXCEPT THAT THE HIDING POWER SHALL BE 0.98 MINIMUM FOR THE COLORS SPECIFIED HEREIN AND THE SPECULAR GLOSS SHALL BE AS SPECIFIED IN TABLE I.
 - CURED FILM: TESTS SPECIFIED IN MIL-P-22808 FOR QUALITATIVE REQUIREMENTS OF THE CURED FILM SHALL NOT CONSTITUTE PART OF THE ACCEPTANCE AND INSPECTION REQUIREMENTS.
 - PACKAGING: THE MATERIAL SHALL BE FURNISHED IN KIT FORM SUCH THAT THE VOLUME RATIO IS TWO PARTS EPOXY RESIN COMPONENT (PART A) TO ONE PART CATALYST COMPONENT (PART B). CONTAINER SIZE MAY BE 1 QUART MULTIPLE FRICTION TOP FOR PART A, AND 1 PINT MULTIPLE FRICTION TOP FOR PART B, AS OPPOSED TO THOSE SIZES SPECIFIED IN MIL-P-22808, AT THE OPTION OF THE PURCHASER.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES |
| | | TOLERANCES ON |
| | | FRACTIONS DECIMALS ANGLES |
| | | ± ± ± |
| | | DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE REQUIREMENTS |
| | | HEAT TREATMENT |
| | | NONE |
| NEXT ASSY | USED ON | FINAL FINISH |
| | | NONE |
| APPLICATION | | |

| | | | |
|---|-------------------------|--|----------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DWG NO | CONTRACT | PAINT, EPOXY | |
| DRAWN <i>J. Amey</i> | DATE <i>22 JUL 65</i> | | |
| CHECKED <i>W. B. Hill</i> | DATE <i>26 JUL 65</i> | | |
| APPROVAL <i>N. B. Hill</i> | DATE <i>8/24/65</i> | | |
| APPROVAL | | | |
| NASA APPROVAL <i>W. B. Hill</i> | | CODE IDENT NO. | SIZE |
| MIT APPROVAL <i>W. B. Hill</i> | | 80230 | C |
| | | SCALE NONE | WT |
| | | SHEET 1 OF 2 | |

SPECIFICATION CONTROL DRAWING

NASA DRAWING NO.

1008809

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REQUIREMENTS: (CONTINUED)

3. DESIGN:

- A. SHELF LIFE: TWELVE MONTHS MINIMUM FROM THE DATE OF MANUFACTURE. THE MATERIAL SHALL HAVE A MINIMUM OF 10 MONTHS SHELF LIFE WHEN RECEIVED BY THE PURCHASER AND STORED IN THE UNOPENED CONTAINERS AT A TEMPERATURE OF 80°F MAX.
- B. PROPERTIES: THE MATERIAL SHALL COMPLY WITH REQUIREMENTS OF MIL-P-22808 INCLUDING THE DRY FILM PROPERTIES EXCEPT THAT COLOR, GLOSS, PIGMENTATION, ACCEPTANCE INSPECTION, AND PACKAGING SHALL BE AS SPECIFIED IN SECTION 2.
- C. INTENDED USE: THIS MATERIAL IS INTENDED TO BE USED AS A TWO PART EPOXY PAINT SYSTEM TO PROVIDE AN ADHERENT, ABRASION AND MAR RESISTANT FINISH OVER METALLIC AND NON-METALLIC SUBSTRATES.

TABLE I

| NASA DASH NUMBER (SEE NOTE 1) | COLOR | COLOR NUMBER FED-STD-595 | SPECULAR GLOSS |
|--|------------|--------------------------------|-------------------|
| -1 | DARK GRAY | 36231 | 2 TO 5 |
| -2 | LIGHT GRAY | 26440 | 30 TO 70 |
| -3 | WHITE | 37886 | 2 TO 5 |
| -4 | BLACK | 27038 | 30 TO 70 |

NOTES:

1. SEE SECTION 2.E.

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± DO NOT SCALE THIS DRAWING MATERIAL |
| | | HEAT TREATMENT |
| NEXT ASSY | USED ON | FINAL FINISH |
| APPLICATION | | |

| | | | |
|---|----------------------------|--|------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE MASS 02-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DWG NO. | DATE | PAINT, EPOXY | |
| DRAWN <i>J. Amey</i> | 22 JUL 68 | | |
| CHECKED <i>W. Diehl</i> | 26 JUL 68 | | |
| APPROVAL <i>W. Diehl</i> | 8/30/68 | | |
| APPROVAL | | SPECIFICATION CONTROL DRAWING | |
| NASA APPROVAL <i>W. Diehl</i> | CODE IDENT NO. | SIZE | NASA DRAWING NO. |
| | 80230 | C | 100 8809 |
| MIT APPROVAL <i>W. Diehl</i> | SCALE | WT | SHEET 2 OF 2 |

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REQUIREMENTS

1. GENERAL:
 - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
 - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISION CONTAINED IN ND 1015404, CLASS 3
 - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002056, EXCEPT THAT THE MAXIMUM TEMPERATURE RANGE SHALL BE PER 3.C. (TO BE QUALIFIED BY USER).
 - D. PART MARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED, IN ACCORDANCE WITH ND 1002019, WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, LOT CODE OR NUMBER, TERMINAL IDENTIFICATION AND NASA PART NUMBER
 - E. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH ND 1002215, CLASS 1, CODE 1.
 - (1) MARKING OF SHIPPING CONTAINERS SHALL CONFORM TO THE MARKING OF UNIT AND INTERMEDIATE PACKAGES AND THE METHODS OF MARKING AS SPECIFIED IN ND 1002215.

REQUIREMENTS CONTINUED ON SHEET 12

TABLE NO. 1

| DASH NO. | FIGURE | CURRENT-MAX | POWER-MAX |
|----------|--------|--------------|-----------|
| | | MILLIAMPERES | WATTS |
| 001 | 1 | 80 | 1.560 |
| 002 | 2 | 5 | .096 |
| 003 | 3 | 6 | .104 |
| 004 | 4 | 2 | .032 |
| 005 | 5 | 17 | .268 |
| 006 | 6 | 5 | .088 |
| 007 | 7 | 50 | .960 |
| 008 | 8 | 2 | .032 |
| 009 | 9 | 1 | .016 |
| 010 | 10 | 70 | 1.400 |
| | | | |
| | | | |
| | | | |

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± — DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| | | | | | |
|---|-------------------------|-------------------|---|---------------|-------------|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. | |
| LIST OF MATERIALS | | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN | <i>J. Kilgus</i> | 27 JUN 67 | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED | <i>R. W. Hooper</i> | 29 JUN 67 | | | |
| APPROVED | <i>R. W. Hooper</i> | 29 JUN 67 | | | |
| APPROVED | | | | | |
| APPROVED MIT | <i>M. M. M. M.</i> | 10/19/67 | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC | <i>A. M. M.</i> | 10/23/67 | 80230 | C | 1008943 |
| DATE | | | SCALE | SHEET 1 OF 14 | |

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REVISIONS TDRR 34925

| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
|-----|------|-------------------------|----|-----|------|-----------|
| E | | REVISION STATUS CHANGED | | | | 20 SEP 67 |

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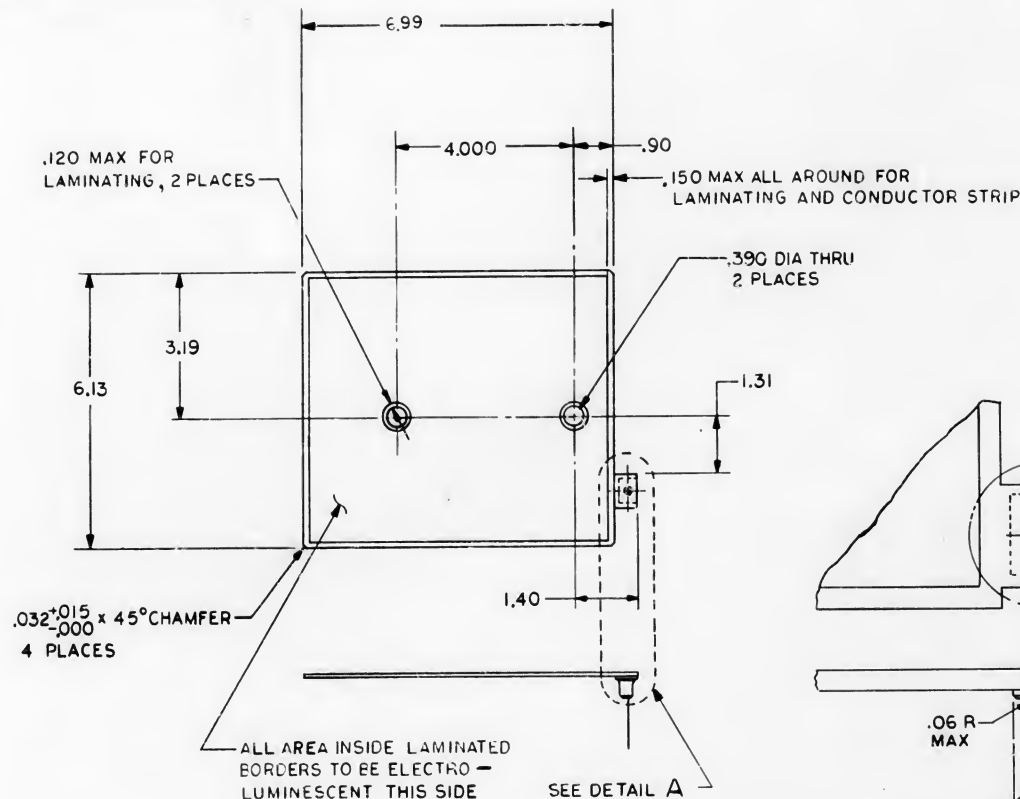
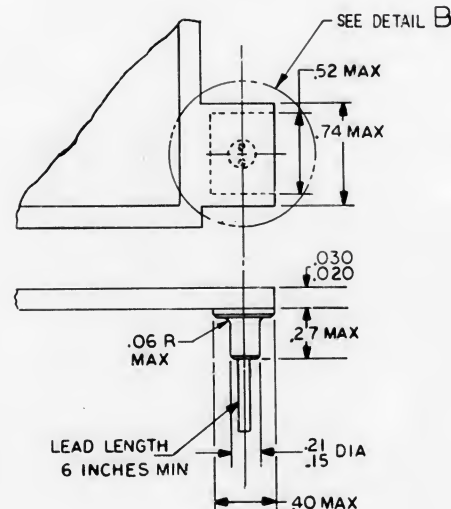
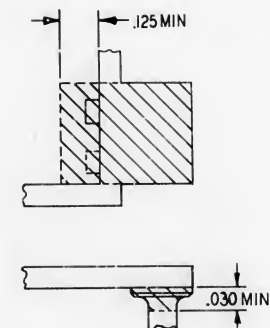


FIGURE 1



DETAIL A



AREA SECTIONED TO BE PROCESSED BOTH SIDES PER 5B OF REQUIREMENTS

DETAIL B

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 P.LC DEC 5 P.LC DEC ANGLES $\pm .02$ $\pm .010$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | |
| | | |
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| | | |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. | |
|--|-------------------------|-------------------|---|----------|---------------|
| LIST OF MATERIALS | | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>J. Williams</i> 27 JUN 67 | | | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>R. Williams</i> 29 JUN 67 | | | | | |
| APPROVED <i>R. Williams</i> 29 JUN 67 | | | | | |
| APPROVED _____ | | | | | |
| APPROVED MIT <i>R. Williams</i> 1-19-67 | | | CODE IDENT NO | SIZE | DRAWING NO. |
| | | | 80230 | C | 1008943 |
| APPROVED MSC <i>R. Williams</i> 1-19-67 | | | DATE | SCALE | SHEET 2 OF 14 |

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1008943 E

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| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
|-----|------|-------------------------|----|-----|------|----------|
| E | | REVISION STATUS CHANGED | | | | 20SEP67 |

ALL AREA INSIDE LAMINATED BORDER TO BE ELECTRO-LUMINESCENT, THIS SIDE

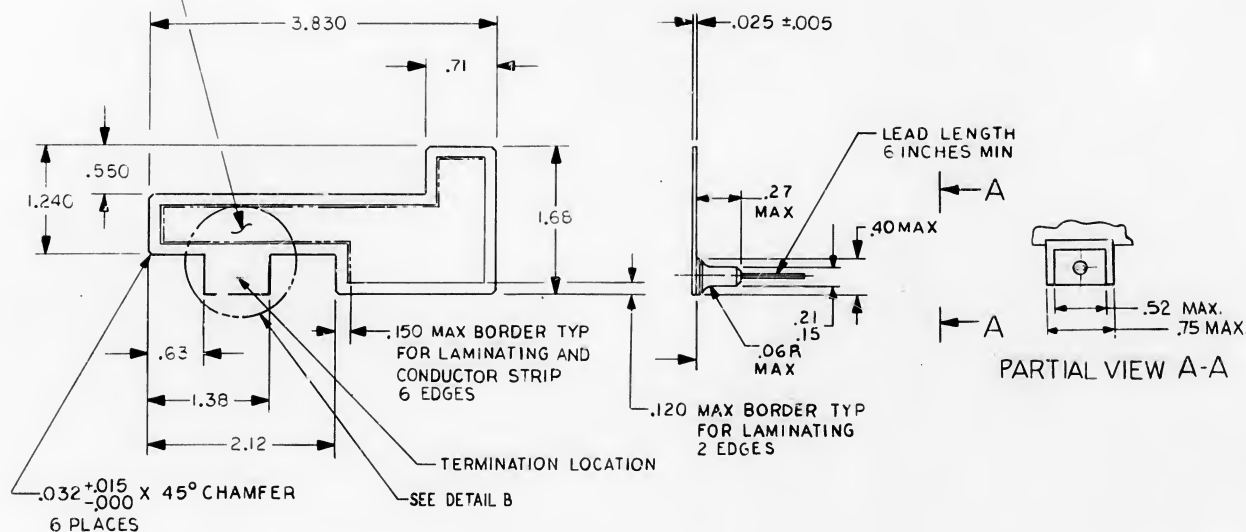
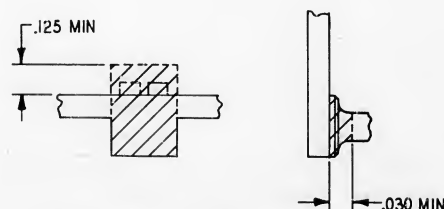


FIGURE 2



AREA SECTIONED TO BE PROCESSED BOTH SIDES PER 5B OF REQUIREMENTS

DETAIL B

| | | |
|-------------|---------|---|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES |
| | | CAPACITOR VALUES ARE IN μ F |
| | | RESISTOR VALUES ARE IN OHMS |
| | | TOLERANCES ON |
| | | 2 PLC DEC 3 PLC DEC ANGLES |
| | | $\pm .02$ $\pm .015$ $\pm 5^\circ$ |
| | | DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|---|-------------------------|---|-----------------------------|---------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>J. H. H. H.</i> | 27 JUN 67 | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>R. H. H.</i> | 29 JUN 67 | | | |
| APPROVED <i>R. H. H.</i> | 29 JUN 67 | | | |
| APPROVED | | | | |
| APPROVED MIT <i>M. H. H.</i> | 10-19-67 | CODE IDENT NO | SIZE | DRAWING NO |
| APPROVED MSC <i>A. H. H.</i> | 10/21/67 | 80230 | C | 1008943 |
| | DATE | SCALE | | SHEET 3 OF 14 |

1008943 E

A

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| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
|-----|------|-------------------------|----|-----|------|-----------|
| E | | REVISION STATUS CHANGED | | | | 26 SEP 67 |

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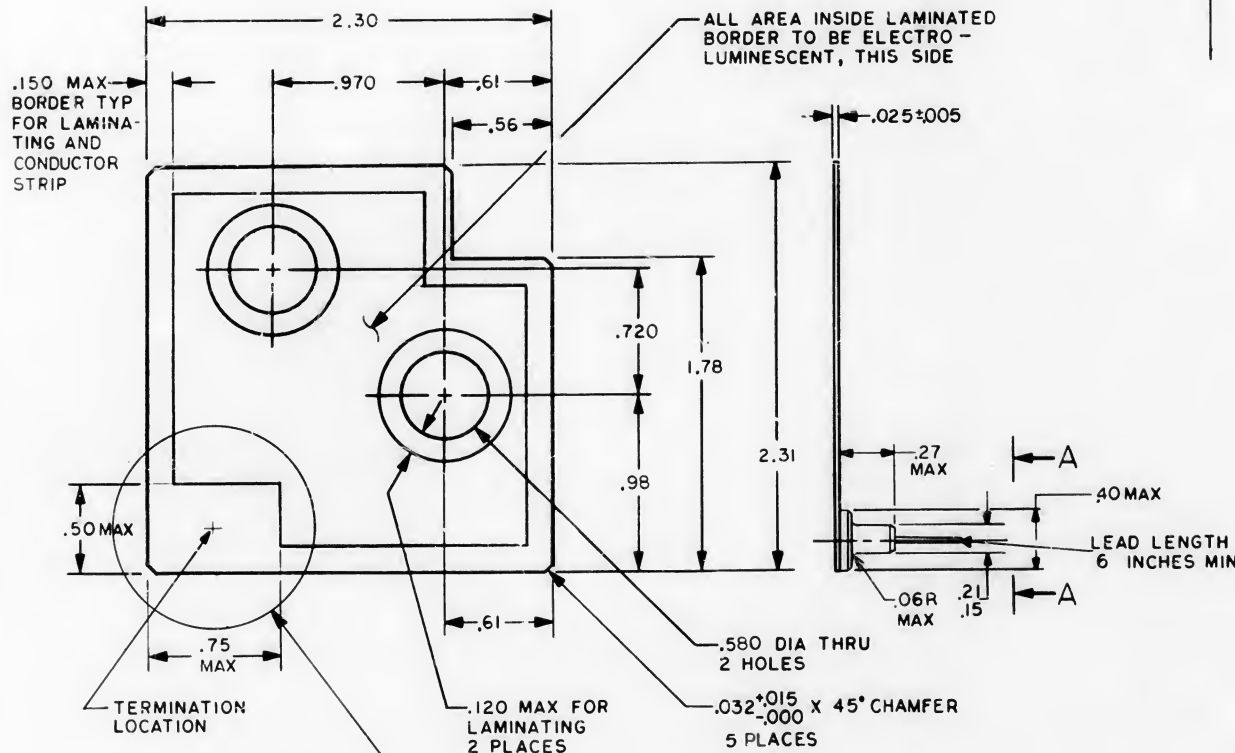
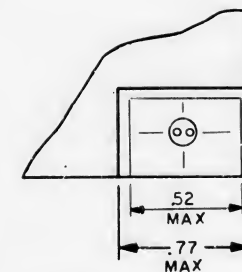
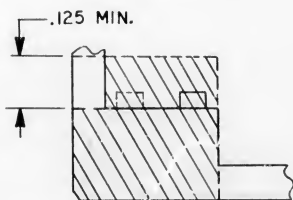


FIGURE 3



PARTIAL VIEW A-A



DETAIL B

AREA SECTIONED TO BE PROCESSED BOTH SIDES PER 5B OF REQUIREMENTS



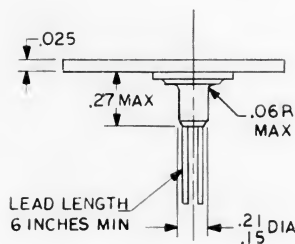
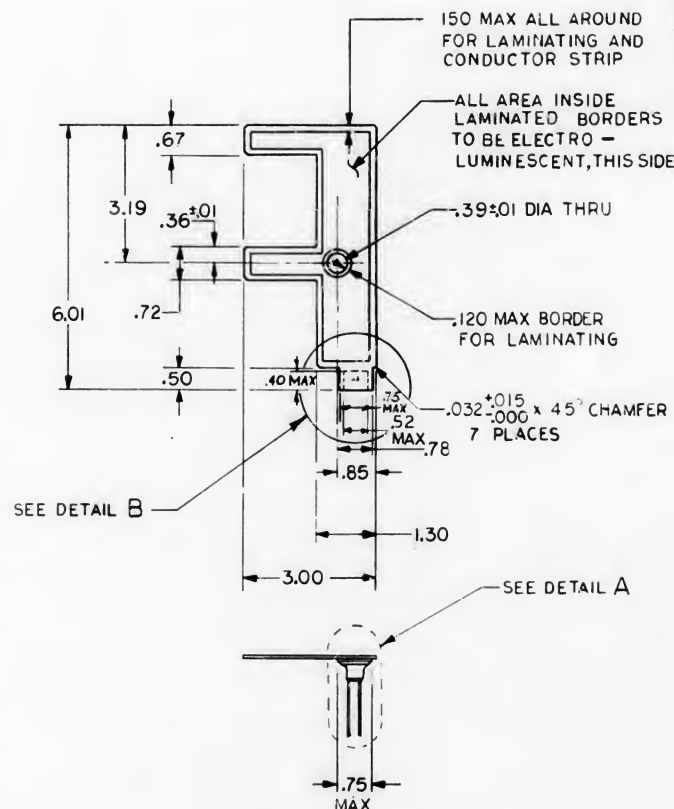
| | | |
|-------------|--|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .010$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| NEXT ASSY | | USED ON |
| APPLICATION | | SEE NOTES |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|--|-------------------------|---|-----------------------------|------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>R. Williams</i> | 28 JUN 67 | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>R. Williams</i> | 29 JUN 67 | | | |
| APPROVED <i>CR</i> | 29 JUN 67 | | | |
| APPROVED <i>W. W. W. W.</i> | 10 JUL 67 | CODE IDENT NO | SIZE | DRAWING NO |
| APPROVED <i>G. C. W.</i> | 10 JUL 67 | 80230 | C | 1008943 |
| DATE | SCALE | SHEET 4 OF 14 | | |

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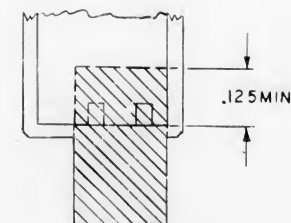
REVISIONS T D R R 34925

| SYM | ZONE | DESCRIPTION | OR | CHK | DATE | APPROVED |
|-----|------|-------------------------|----|-----|------|-----------|
| E | | REVISION STATUS CHANGED | | | | 26 SEP 67 |



DETAIL A

FIGURE 5



AREA SECTIONED TO BE PROCESSED BOTH SIDES PER 5B OF REQUIREMENTS

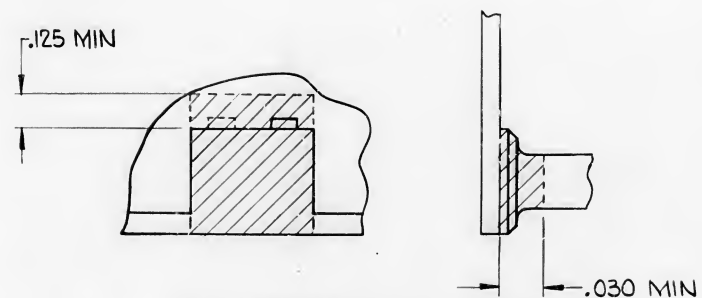
DETAIL B

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|--|-------------------------|--|-----------------------------|----------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>Walisiewicz</i> 6-28-67 | | LAMP | | |
| CHECKED <i>Rutledge</i> 8-7 | | ELECTRO-LUMINESCENT | | |
| APPROVED <i>CR</i> 8-7 | | SPECIFICATION CONTROL DRAWING | | |
| APPROVED | | DRAWING NO. | | |
| APPROVED MIT <i>W.C. Manley</i> 10-19-67 | | CODE IDENT NO. | SIZE | 1008943 |
| APPROVED MSC <i>AM</i> 10-19-67 | | 80230 | c | |
| DATE | | SCALE | SHEET 6 OF 14 | |

| | |
|--|-----------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 5 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING | SEE NOTES |
| MATERIAL | |
| NEXT ASSY | USED ON |
| APPLICATION | |

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[illegible]

AREA SECTIONED TO BE PROCESSED
BOTH SIDES PER 5.B OF REQUIREMENTS

DETAIL B

| | | | | | | | | | | | |
|-------------|--|--|--|----------------------------|--|--|--|-----------------------------------|--|---------------|--|
| | | QTY REQD | | PART OR IDENTIFYING NO. | | MATERIAL OR NOTES | | NOMENCLATURE OR DESCRIPTION | | FIN NO. | |
| | | LIST OF MATERIALS | | | | | | | | | |
| | | MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | | | | |
| | | DRAWN <i>Lehman</i> 09 JUL 67 CHECKED <i>Rutledge</i> 07 APPROVED <i>CR</i> 29 JUN 67 APPROVED _____ | | | | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | | | | |
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ f RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING | | | | | | | | | |
| | | MATERIAL | | | | | | | | | |
| | | SEE NOTES | | | | CODE IDENT NO. SIZE DRAWING NO. 80230 C 1008943 | | | | | |
| NEXT ASSY | | USED ON | | | | APPROVED MIT <i>MO</i> 0-19-67 | | APPROVED MSC <i>AK</i> 1/21/67 | | DATE | |
| APPLICATION | | | | | | SCALE | | | | SHEET 7 OF 14 | |

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| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
|-----|------|-------------------------|----|-----|------|----------|
| E | | REVISION STATUS CHANGED | | | | 10/12/67 |

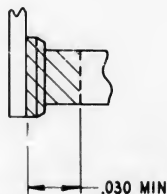
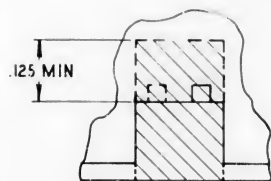
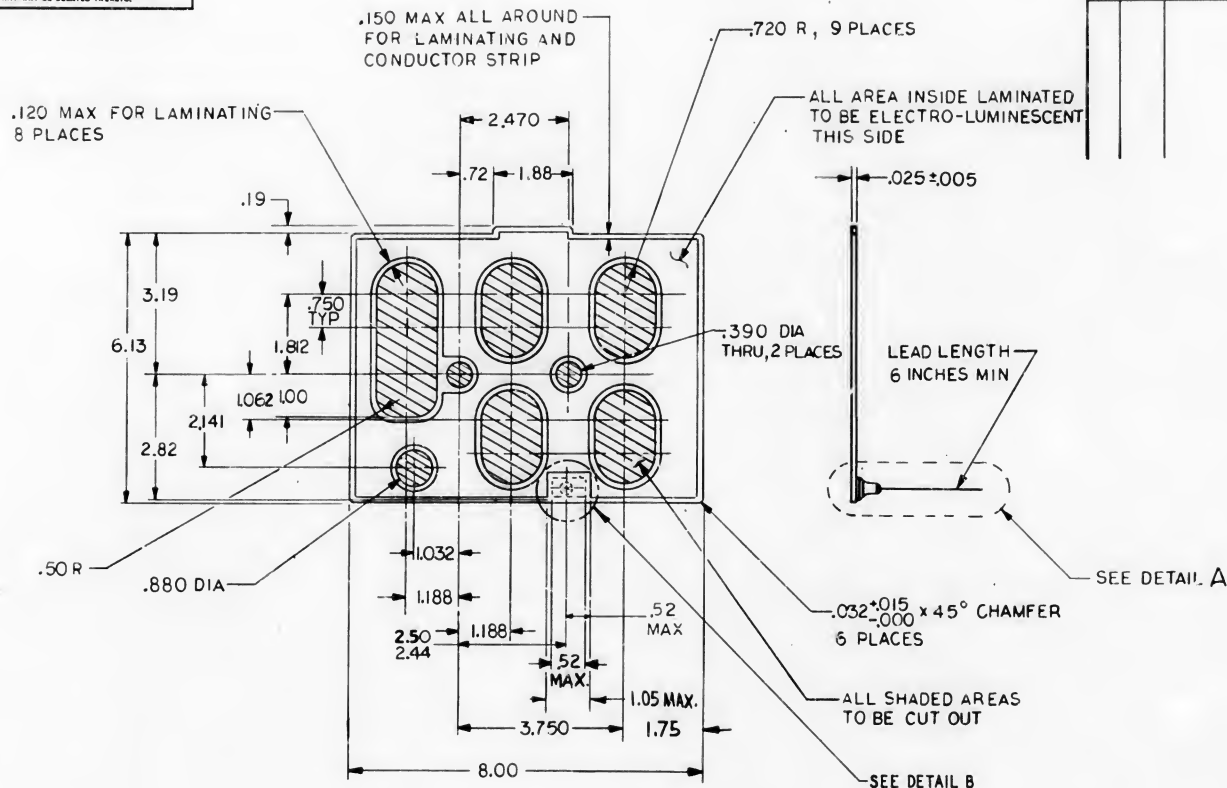
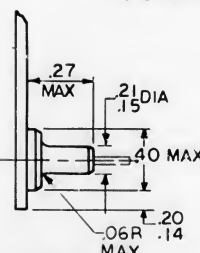


FIGURE 7



DETAIL A

| | | |
|-------------|---------|---|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES |
| | | TOLERANCES ON |
| | | 2 PLC DEC. 3 PLC DEC. ANGLES |
| | | ± .02 ± .010 ± 5° |
| | | DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIG NO. |
|--|-------------------------|--|-----------------------------|-------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN J. WOLSEY | 28 JUN 67 | LAMP | | |
| CHECKED Rustique | 28 JUN 67 | ELECTRO-LUMINESCENT | | |
| APPROVED CR Davis | 29 JUN 67 | SPECIFICATION CONTROL DRAWING | | |
| APPROVED MIT | 10-9-67 | CODE IDENT NO | SIZE | DRAWING NO. |
| APPROVED MSC | 10/12/67 | 80230 | C | 1008943 |
| DATE | | SCALE | SHEET 8 OF 14 | |

1008943 E

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REVISIONS TDRR 34925

| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
|-----|------|-------------------------|----|-----|------|--------------------|
| E | | REVISION STATUS CHANGED | | | | <i>[Signature]</i> |
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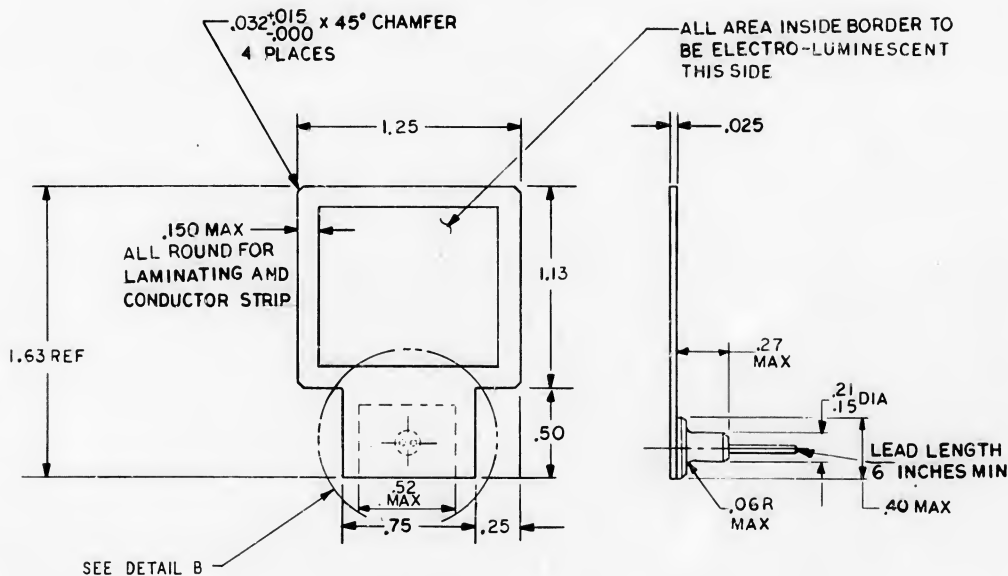
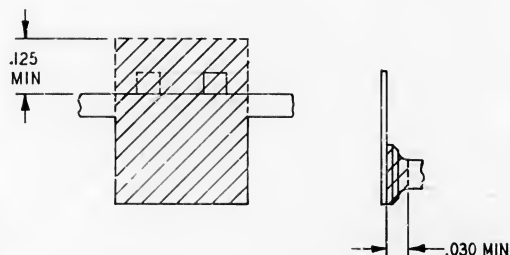


FIGURE 8



AREA SECTIONED TO BE PROCESSED
BOTH SIDES PER 5B OF REQUIREMENTS

DETAIL B

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ f RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|---|----------------------------|--|--------------------------------|---------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>[Signature]</i> | 27 JUN 67 | LAMP ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>[Signature]</i> | 29 JUN 67 | | | |
| APPROVED <i>[Signature]</i> | 29 JUN 67 | | | |
| APPROVED MIT <i>[Signature]</i> | 10-19-67 | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC <i>[Signature]</i> | 10/25/67 | 80230 | C | 1008943 |
| | DATE | SCALE | | SHEET 9 OF 14 |

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| REVISIONS T DRR 34925 | | | | | |
|-----------------------|------|-------------------------|----|-----|-----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE |
| E | | REVISION STATUS CHANGED | | | 26 SEP 67 |
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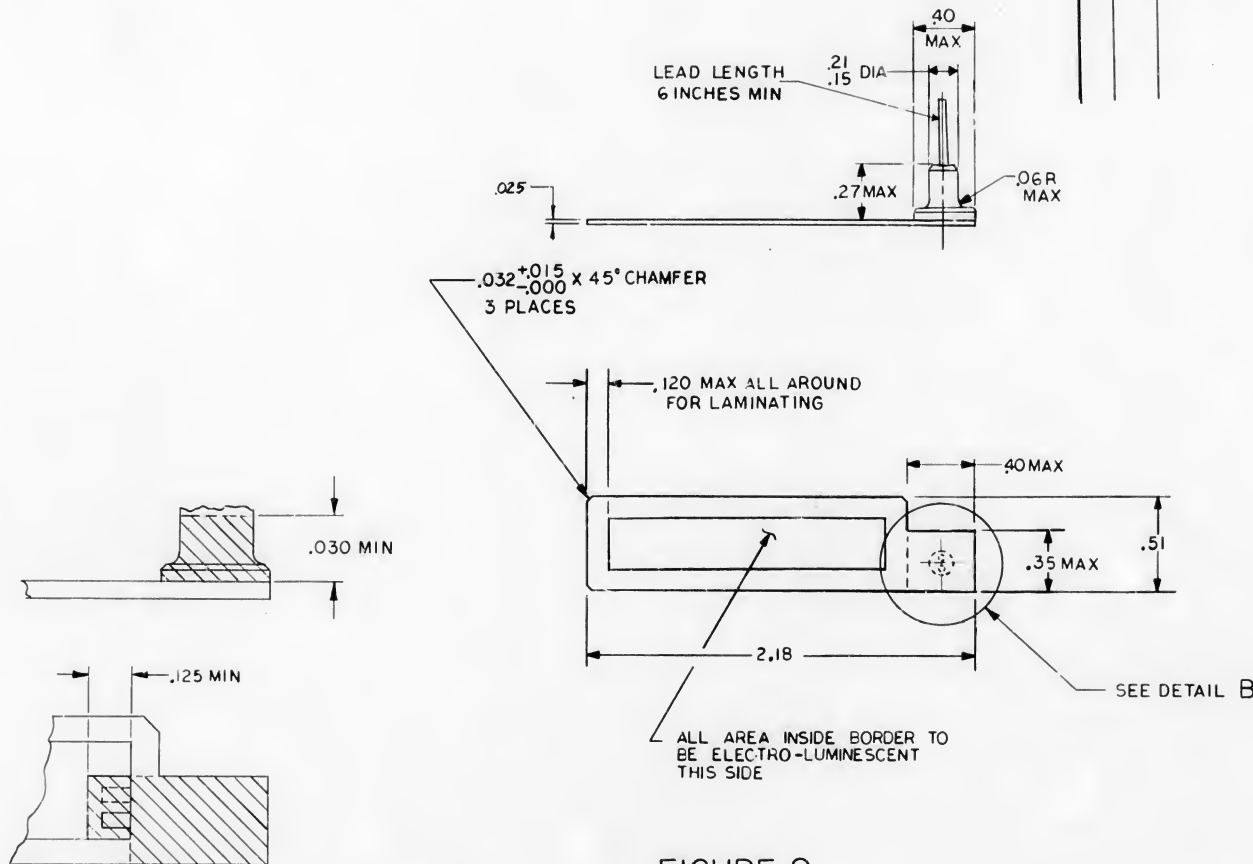


FIGURE 9

AREA SECTIONED TO BE PROCESSED BOTH SIDES PER 5.B OF REQUIREMENTS

DETAIL B

| | | | | |
|---|----------------------------|--|--------------------------------|-------------|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>W. S. S. 6-28</i> | | LAMP | | |
| CHECKED <i>R. S. S. 29 JUN 67</i> | | ELECTRO-LUMINESCENT | | |
| APPROVED <i>CR 29 JUN 67</i> | | SPECIFICATION CONTROL DRAWING | | |
| APPROVED MIT <i>M. S. S. 10-19-67</i> | | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC <i>10-23-67</i> | | 80230 | c | 1008943 |
| DATE | | SCALE | SHEET 10 OF 14 | |

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REVISIONS TDRR 34925

| ZONE | LTR | DESCRIPTION | DATE | APPROVED |
|------|-----|-------------------------|------|----------|
| | E | REVISION STATUS CHANGED | | 12/26/67 |

REQUIREMENTS: (CONTINUED)

2. ACCEPTANCE AND INSPECTION (100%):

A. MECHANICAL PROPERTIES:

- (1) DIMENSION: SHALL BE AS SHOWN PER TABLE NO. 1.
- (2) LEAD STRENGTH: LEADS SHALL BE CAPABLE OF WITHSTANDING A 2 POUND AXIAL PULL.
- (3) LEAD MATERIAL: SHALL BE PER MIL-W-16878 (TYPE E-26). THE LEAD CONNECTED TO THE ELECTRO-LUMINESCENT SIDE SHALL HAVE LIGHT BROWN INSULATION AND THE LEAD CONNECTED TO THE REVERSE SIDE SHALL HAVE BLACK INSULATION. THE COLORS SHALL BE EASILY DISCERNIBLE.
- (4) VISUAL INSPECTION: EACH UNIT SHALL BE INSPECTED IN THE "TOP HAT" AREA UNDER 20X MAGNIFICATION FOR THE FOLLOWING REQUIREMENTS:
 - a. COPPER BRAID SHALL BE FREE OF FOLD-OVER.
 - b. VISIBLE OPENS TO THE BRAID OR WIRE LEAD SHALL NOT EXCEED 2 AND THE MAXIMUM OPENING SHALL NOT EXCEED 0.020 INCH IN ANY DIRECTION. NO COATING SHALL BE APPLIED TO THE LAMP TOP HAT.

- (5) TOP HAT LOCATION: THE TOP HAT SHALL BE CENTERED WITHIN THE TAB AREA WITHIN 3/64 INCH IN ANY DIRECTION.

B. ELECTRICAL AND PHOTOMETRIC PROPERTIES:

- (1) TRANSIENT VOLTAGE: THE LAMP SHALL BE EXCITED WITH 160 ± 5 VOLTS RMS, 400 HZ, FOR 5 SECONDS MINIMUM. AFTER APPLICATION OF THIS VOLTAGE THE LAMP MUST BE CAPABLE OF MEETING THE OTHER REQUIREMENTS OF SECTION B.
- (2) LIGHT INTENSITY: 1.2 TO 2.0 FOOT-LAMBERTS INITIALLY WHEN EXCITED WITH 75 ± 1.0 VOLTS RMS, 400 ± 10 HZ.
- (3) CURRENT: PER TABLE NO. 1, WHEN EXCITED PER 2.B.(2).
- (4) POWER: PER TABLE NO. 1, WHEN EXCITED PER 2.B.(2).
- (5) LIGHT OUTPUT COLOR: THE LIGHT OUTPUT COLOR SHALL BE AS SPECIFIED IN 3.F.(1). AS DETERMINED BY MEASUREMENT OF A REPRESENTATIVE SAMPLE OF EACH PRODUCTION RUN AND VISUAL COMPARISON OF THE LAMPS WITH THE SAMPLE.

3. DESIGN:

- A. OPERATING LIFE: 2000 HOURS MINIMUM AT 25°C WITH A LOSS OF NOT MORE THAN 90% OF ORIGINAL LIGHT INTENSITY. MEASUREMENTS ACCOMPLISHED WHEN EXCITED PER 2.B.(2) AT 25°C .
- B. STORAGE LIFE: 1 YEAR MINIMUM WITHOUT LOSS OF ELECTRICAL PERFORMANCE AT 0° TO $+76^{\circ}\text{C}$.
- C. OPERATING TEMPERATURE RANGE: -55°C TO $+65^{\circ}\text{C}$. ACCELERATED LIFE DEGRADATION IS NOTED WITH OPERATION ABOVE 25°C .
- D. SEAL DESIGN OBJECTIVE: THE LAMPS SHALL BE SUBJECTED TO THE IMMERSION TEST (CONDITION B) SPECIFIED IN MIL-STD-202C. THE LIGHT INTENSITY OF PARAGRAPH 2.B.(2) AND THE DC INSULATION RESISTANCE OF PARAGRAPH 5.B.(8) SHALL BE CHECKED AFTER THE IMMERSION AS ACCEPTANCE CRITERIA.
- E. MATERIAL:

- (1) ACLAR ENCAPSULATED ELECTRO-LUMINESCENT LAMP.
- (2) THE LEAD INSULATION SHALL BE CHEMICALLY TREATED IN A MANNER TO ALLOW ADHESIVE BONDING OR POTTING AND ALLOW THE UNIT TO MEET THE IMMERSION TEST REQUIREMENT OF 3.D.

| | | | |
|---|---|---|-------------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| 2 PLACE 3 PLACE DECIMALS DECIMALS ANGLES + + + - - - | DRAWN <u>J. KILVINGER</u> 28 JUN 67 DATE CHECKED <u>R.W. HOGUE</u> 29 JUN 67 APPROVAL <u>C.R. CRAVEN</u> 29 JUN 67 | LAMP ELECTRO-LUMINESCENT | |
| DO NOT SCALE THIS DRAWING | CONTRACT | SPECIFICATION CONTROL DRAWING | |
| MATERIAL SEE NOTES | NASA APPROVAL <u>[Signature]</u> 15-12-67 MIT APPROVAL <u>[Signature]</u> 15-12-67 | SIZE C | CODE IDENT NO. 80230 |
| APPROVAL | | SCALE | SHEET 12 OF 14 |

1008943/E

B

A

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REQUIREMENTS: (CONTINUED)

F. RATING:

- (1) LIGHT OUTPUT COLOR: $X = 0.33 \pm 0.02$, $Y = 0.33 \pm 0.02$ PER CIE DIAGRAM.
- (2) MAXIMUM CONTINUOUS VOLTAGE: 120 V RMS, 400 Hz.
- (3) UNIFORMITY OF LIGHT INTENSITY: THE LIGHT INTENSITY SHALL BE UNIFORM OVER THE FACE OF THE LAMP WITHIN 10%.
- (4) UNIFORMITY OF LIGHT OUTPUT COLOR: THE LIGHT OUTPUT COLOR SHALL BE UNIFORM OVER THE FACE OF THE LAMP WITHIN THE TOLERANCE SPECIFIED IN 3.F.(1).

4. SPECIAL CONDITIONING BY MANUFACTURER:

- A. ALL LAMPS SHALL BE BURNED-IN FOR A PERIOD OF 50 TO 100 HOURS PRIOR TO THE ACCEPTANCE AND INSPECTION TESTS IN 2.B. ABOVE. THE BURN-IN CONDITIONS SHALL BE AS FOLLOWS:
- (1) TEMPERATURE: $25^\circ \pm 5^\circ\text{C}$.
 - (2) OPERATING VOLTAGE: $115 \pm 10\text{V RMS}$, $60 \pm 5\text{ Hz}$ FOR THE FIRST 50 HOURS, AND 120 V RMS , $400 \pm 10\text{ Hz}$ FOR REMAINDER OF BURN-IN.

5. SPECIAL PROCESSING BY USER: PRIOR TO ANY REWORK, THE UNIT SHALL BE CURED FOR 4 HOURS MINIMUM UNDER A TEMPERATURE OF $140^\circ\text{F} \pm 5^\circ\text{F}$ AND A PRESSURE OF 1 MM OF Hg NOMINAL.

- A. MATERIAL PREPARATION: CHLOROTRIFLUOROETHYLENE COPOLYMER SOLUTION (CTFE) (SUPPLIER: ALLIED CHEMICALS: TYPE ACLAR 22A)
- (1) CLEAN CTFE FILM OR SHEET PER FED SPECIFICATION L-P-001174 (GSA-FSS) TYPE I BY SCRUBBING WITH COMMERCIAL GRADE ISOPROPYL ALCOHOL.
 - (2) DISSOLVE THE CLEANED CTFE IN COMMERCIAL GRADE HEXAFLUOROBENZENE TO FORM A 10% BY WEIGHT SOLIDS CONTENT SOLUTION. THE SOLUTION SHALL BE ACCOMPLISHED IN A SEALED CONTAINER AT ROOM TEMPERATURE IN 16 HOURS.

CAUTION: THE TOXICITY OF HEXAFLUOROBENZENE HAS NOT BEEN ESTABLISHED ALTHOUGH IT HAS BEEN FOUND TO BE AN ANESTHETIC EVEN IN RELATIVELY LOW CONCENTRATIONS. THE MATERIAL SHOULD THEREFORE BE TREATED AS POTENTIALLY HAZARDOUS. CAUTION SHOULD BE TAKEN TO USE THE MATERIAL ONLY IN WELL VENTILATED AREAS, SUCH AS IN OR DIRECTLY IN FRONT OF A FUME HOOD. BREATHING OF THE VAPOR SHOULD BE AVOIDED.

- (3) DYE THE SOLUTION TO A GARDNER COLOR OF 13 ± 1 AS DETERMINED BY ASTM-D-1544 USING A SOLVENT YELLOW 14 DYE HAVING A COLOR INDEX NUMBER OF 12055.

B. APPLICATION OF CTFE SOLUTION: (NOTE: THIS PRECONDITIONING APPLIES TO PIECE PART LEVEL REPAIR ONLY.)

- (1) CLEAN DETAIL B AREAS WITH FREON TF TO REMOVE PREVIOUS COATING.
- (2) ABRABE AREA B INCLUDING TOP HAT AS A MINIMUM WITH 320 GRIT ALUMINUM OXIDE PAPER TO REDUCE SURFACE GLOSS.
- (3) FLUSH WITH COMMERCIAL GRADE ISOPROPYL ALCOHOL AND DRY AT ROOM TEMPERATURE.
- (4) BRUSH A THIN COAT OF CTFE SOLUTION ON DETAIL B AREAS.

| REVISIONS TDRR 34925 | | | |
|----------------------|-----|-------------------------|---------------|
| ZONE | LTR | DESCRIPTION | DATE |
| | E | REVISION STATUS CHANGED | Rev 26 SEP 77 |

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|--|---|--|---|------------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE 3 PLACE DECIMALS DECIMALS ANGLES + — + — + — — — — — — | MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| | DRAWN <u>J. KILVINGER</u> 28 JUN 67 CHECKED <u>R.W. HOGUE</u> 29 JUN 67 APPROVAL <u>C.R. CRAVEN</u> 29 JUN 67 | | LAMP, ELECTRO-LUMINESCENT | |
| | DO NOT SCALE THIS DRAWING | | SPECIFICATION CONTROL DRAWING | |
| | MATERIAL SEE NOTES | | SIZE C | CODE IDENT NO 80230 |
| APPROVAL | | MIT APPROVAL <u>[Signature]</u> 10/17/71 | SCALE | SHEET 13 OF 14 |

1008943E

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REQUIREMENTS: (CONTINUED)

NOTE: TO PREVENT BUBBLING OR BLUSHING OF THE APPLIED COATING THE ROOM TEMPERATURE SHALL BE 70 TO 75°F, AND THE RELATIVE HUMIDITY 50% MAXIMUM. HEAT SOURCES SHALL BE REMOVED FROM THE IMMEDIATE VICINITY AND THE LAMPS SHOULD NOT BE HANDLED DIRECTLY.

- (5) CURE FOR 30 MINUTES MINIMUM AT 75°F MAXIMUM, FOLLOWED BY A 30 MINUTE MINIMUM CURE AT 140° ± 5°F.
- (6) REPEAT STEP 4 AND CURE FOR 60 MINUTES MINIMUM AT 75°F MAXIMUM AFTER EACH COAT UNTIL A UNIFORM DRY FILM THICKNESS OF 0.003 INCHES MINIMUM IS OBTAINED. (NORMALLY OBTAINED BY APPLICATION OF 4 COATS).

- (7) FINAL CURE TO BE 24 HOURS MINIMUM AT 140 ± 5°F.

- (8) FOLLOWING FINAL CURE THE UNIT SHALL BE VISUALLY INSPECTED FOR THE FOLLOWING:

- a. COATING SHALL BE CLEAR
- b. BUBBLES SHALL NOT BE CONTINUOUS TO THE OUTER SURFACE.
- c. NO INDIVIDUAL BUBBLE OR CLUSTER OF BUBBLES SHALL EXCEED 1/32 INCH IN ANY DIRECTION. TOTAL SURFACE AREA COVERED BY BUBBLES SHALL NOT EXCEED 5% OF THE REPAIRED AREA.
- d. COATING SHALL BE FREE OF CRACKS AND CRAZING WHEN VIEWED UNDER 3X MAGNIFICATION.

UNIT SHALL ALSO PASS THE FOLLOWING DC INSULATION RESISTANCE TEST: THE LEADS OF THE LAMP SHALL BE CONNECTED TOGETHER AND THE DC INSULATION RESISTANCE MEASURED USING A LOW VOLTAGE OHMMETER BETWEEN THE LEADS TIED TOGETHER AND THE REPAIRED SURFACE. THE UNIT MAY BE CHECKED EITHER BY IMMERSION IN A 1% SALT SOLUTION OR WITH A PROBE WETTED WITH 1% SALT WATER SOLUTION OR EQUIVALENT. THE DC RESISTANCE SHALL NOT BE LESS THAN 10 MEGOHMS.

- (9) IF REPAIRED UNIT DOES NOT PASS THE REQUIREMENTS AFTER REPAIR, REMOVE THE COATINGS WITH HEXAFLUOROBENZENE AND REAPPLY PER PARAGRAPH 5.

- (10) SUBJECT ALL REPAIRED LAMPS TO AN ALTITUDE TEST PERFORMED IN ACCORDANCE WITH MIL-STD-810, METHOD 500, PROCEDURE II. THE TEST SHALL BE PERFORMED AT AN ATMOSPHERIC PRESSURE OF 10-4 MM OF HG. AND AT A TEMPERATURE OF 90° ± 5°F FOR 4 HOURS AND RETURN TO ROOM PRESSURE IN 1 HOUR. THIS TEST MAY BE PERFORMED AT THE PIECE PART OR ASSEMBLY LEVEL. FOLLOWING THE ALTITUDE TEST, THE DC INSULATION RESISTANCE SPECIFIED IN PARAGRAPH 5.8(8) SHALL BE PERFORMED.

| REVISIONS TDRR 34925 | | | |
|----------------------|-----|-------------------------|-----------|
| ZONE | LTR | DESCRIPTION | DATE |
| | E | REVISION STATUS CHANGED | 26 SEP 67 |

| | | | | | |
|---|--|---|--|--|----------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: | | M I T INSTRUMENTATION LAB | | MANNED SPACECRAFT CENTER HOUSTON TEXAS | |
| 2 PLACE DECIMAL DECIMALS FOR ANGLES | | DRAWN <u>J. KILVINGER</u> 28 JUN 67 | | LAMP, ELECTRO-LUMINESCENT | |
| + - - - - | | CHECKED <u>R.W. HOGUE</u> 28 JUN 67 | | | |
| - - - - - | | APPROVAL <u>C.R. CRAVEN</u> 29 JUN 67 | | | |
| DO NOT SCALE THIS DRAWING | | CONTRACT | | SPECIFICATION CONTROL DRAWING | |
| MATERIAL | | NASA APPROVAL <u>[Signature]</u> 10/11/67 | | SIZE | CODE IDENT NO. |
| SEE NOTES | | MIT APPROVAL <u>[Signature]</u> 10/11/67 | | C | 80230 |
| APPROVAL | | SCALE | | 1008943 | |
| | | | | SHEET 14 OF 14 | |

REQUIREMENTS:

1. GENERAL:

- A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS CONTAINED IN ND 1015404, CLASS 2.
- C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002056, EXCEPT THAT THE MAXIMUM TEMPERATURE RANGE SHALL BE PER 3.C. (TO BE QUALIFIED BY USER).
- D. PART MARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED, IN ACCORDANCE WITH ND 1002019, WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, LOT CODE OR NUMBER, TERMINAL IDENTIFICATION AND NASA PART NUMBER. THE INK USED SHALL BE PER SCD 1010920 AND MARKINGS SHALL BE COATED WITH A CHLOROTRIFLUOROETHYLENE COPOLYMER SOLUTION.
- E. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH ND 1002215, CLASS 1, CODE 1.
- (1) MARKING OF SHIPPING CONTAINERS SHALL CONFORM TO THE MARKING OF UNIT AND INTERMEDIATE PACKAGES AND THE METHODS OF MARKING AS SPECIFIED IN ND 1002215, CLASS 1, CODE 2.

2. ACCEPTANCE AND INSPECTION (100%):

A. MECHANICAL PROPERTIES:

- (1) VISUAL INSPECTION: EACH LAMP TERMINATION AREA SHALL BE INSPECTED UNDER MAGNIFICATION AND COMPARED TO CONTAMINATION STANDARDS SELECTED AND APPROVED BY SUPPLIER AND USER FOR THE FOLLOWING:
- PARTICLE CONTAMINATION WITHIN, WHEN VIEWED UNDER 10X MAGNIFICATION, VISIBLE EVIDENCE OF CONDUCTIVE EPOXY SHALL BE ACCEPTABLE.
 - SCRATCHES, CHIPS, PITTING AND CRACKS ON THE EXTERNAL SURFACE WHEN VIEWED UNDER 10X MAGNIFICATION.
 - THE ENCAPSULATED CONDUCTORS SHALL BE FREE OF BENDS, KINKS AND OTHER PROTRUSIONS WHICH WOULD CAUSE THEM TO BE EXPOSED ON THE SURFACE.
- (2) DIMENSIONS: SHALL BE AS SHOWN PER APPLICABLE FIGURE IDENTIFIED IN TABLE 1.
- (3) LEAD STRENGTH: EACH LEAD SHALL WITHSTAND A TWO (2) POUND AXIAL PULL. FORCE SHALL BE APPLIED AND REMOVED GRADUALLY.
- (4) LEAD MATERIAL: SHALL BE PER SCD 1008951. THE LEAD CONNECTED TO THE ELECTRO-LUMINESCENT SIDE SHALL HAVE LIGHT BROWN INSULATION (ETCHED WHITE WIRE) AND THE LEAD CONNECTED TO THE REVERSE SIDE SHALL HAVE BLACK INSULATION (ETCHED). THE COLORS SHALL BE EASILY DISCERNIBLE.
- (5) DELAMINATION AND/OR SEPARATION: THE EL LAMP SHALL SHOW NO SIGNS OF DELAMINATION. SEPARATION OF THE LAMP ENVELOPE FROM THE LAMP SHALL NOT BE PRESENT IN THE LIGHTED AREA AND SEPARATION IN OTHER AREAS SHALL NOT AFFECT THE PERFORMANCE OF THE LAMP.

REQUIREMENTS CONTINUED ON SHEET 12.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034
FOR THIS DRAWING.

| REVISIONS | | | | |
|-----------|-----|--|-----------|----------|
| ZONE | LTR | DESCRIPTION | DATE | APPROVED |
| | C | REPLACES REV B WITH CHANGE PER TDRR 35494 | 23-FEB-68 | B |
| | D | REVISION STATUS CHANGED | 6-MAR-68 | LK |
| | E | REVISED PER TDRR 36062 | 16-APR-68 | JJJ YML |

| | | | | | |
|---|--|--|--|--|----------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | MIT INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| 2 PLACE 3 PLACE DECIMALS DECIMALS ANGLES + - - + - - | | DRAWN <u>KNOLL</u> 26-JUN-67 DATE | | LAMP ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | |
| | | CHECKED <u>HOGUE</u> 27-JUN-67 | | | |
| | | APPROVAL <u>CRAMER</u> 27-JUN-67 | | | |
| DO NOT SCALE THIS DRAWING | | CONTRACT <u>NAS9-497</u> | | | |
| MATERIAL | | A.C. MIT 13-SEP-67 NASA APPROVAL | | SIZE | CODE IDENT NO. |
| | | WATSON 23-AUG-67 MIT APPROVAL | | C | 80230 |
| APPROVAL | | | | SCALE | 1008944 |
| | | | | | SHEET 1 OF 13 |

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| REVISIONS | | | | | | |
|-----------|------|---|----|-----|-----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| C | | REPLACES REV B WITH CHANGE PER TDRR 35434 | B | SW | 21 FEB 68 | |
| D | | REVISED PER TDRR 35542 | LK | LM | 16 APR 68 | |
| E | | REVISION STATUS CHANGED | JJ | BT | 16 APR 68 | |

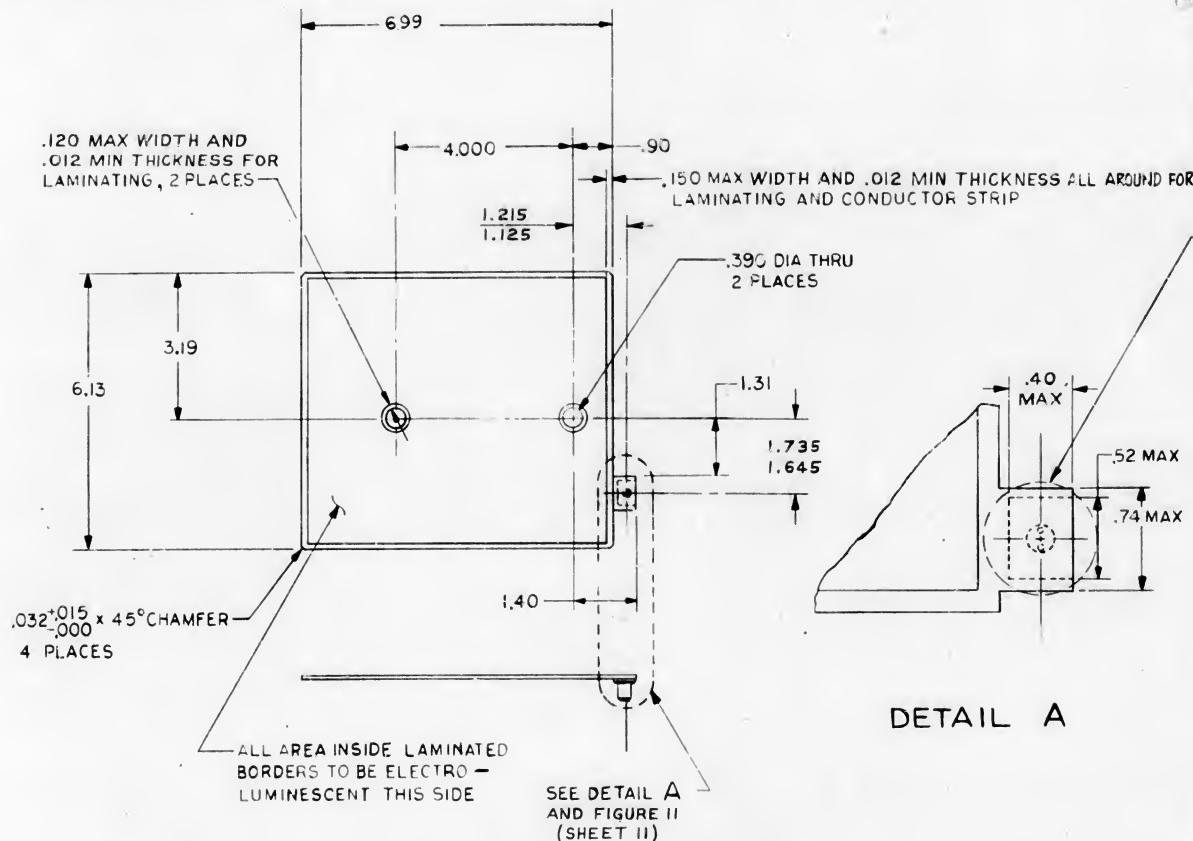
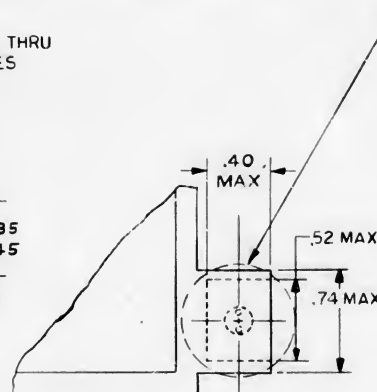


FIGURE 1



DETAIL A

TERMINATION DETAIL (TYP)

MAX THICKNESS OVER CONDUCTIVE EPOXY: .040 (THIS AREA ONLY)

ALUMINUM FOIL

LEAD SPREAD SHALL NOT EXTEND BEYOND 1/32 INCH PAST THE ALUMINUM FOIL CONDUCTOR EDGE. THERE SHALL BE NO OVERLAPPING OF THE LEAD STRANDS OUTSIDE THE ZONE COVERED BY THE TOP HAT STEM. A MINIMUM OF 5 STRANDS SHALL BE IN CONTACT WITH THE CONDUCTIVE EPOXY AND ALL SEVEN STRANDS SHALL CONTACT THE FOIL.

CONFIGURATION I

MAX THICKNESS OVER CONDUCTIVE EPOXY .040 (THIS AREA ONLY)

ALUMINUM FOIL

LEAD SPREAD SHALL NOT EXTEND BEYOND 1/32 INCH PAST THE ALUMINUM FOIL CONDUCTOR EDGE. THERE SHALL BE NO OVERLAPPING OF THE LEAD STRANDS OUTSIDE THE ZONE COVERED BY THE TOP HAT STEM. A MINIMUM OF 5 STRANDS SHALL BE IN CONTACT WITH THE CONDUCTIVE EPOXY AND ALL SEVEN STRANDS SHALL CONTACT THE FOIL.

CONFIGURATION II

FIGURE 12

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|---|-------------------------|--|-----------------------------|-------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>W. Knoll</i> 26 JUN 67 | | LAMP. ELECTRO-LUMINESCENT | | |
| CHECKED <i>Bartholme</i> 27 JUN 67 | | SPECIFICATION CONTROL DRAWING | | |
| APPROVED <i>CR. Roman</i> 27 JUN 67 | | | | |
| APPROVED <i>NAS 9-497</i> | | | | |
| APPROVED <i>Ben. Nelson</i> 10/23/67 | | CODE IDENT NO. | SIZE | DRAWING NO. |
| MIT | | 80230 | C | 1008944 |
| APPROVED <i>[Signature]</i> 9/13/67 | | DATE | SCALE | SHEET 2 OF |
| MSC | | | | |

| | |
|--|-----------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .010$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING | |
| MATERIAL | SEE NOTES |
| NEXT ASSY | USED ON |
| APPLICATION | |

1008944

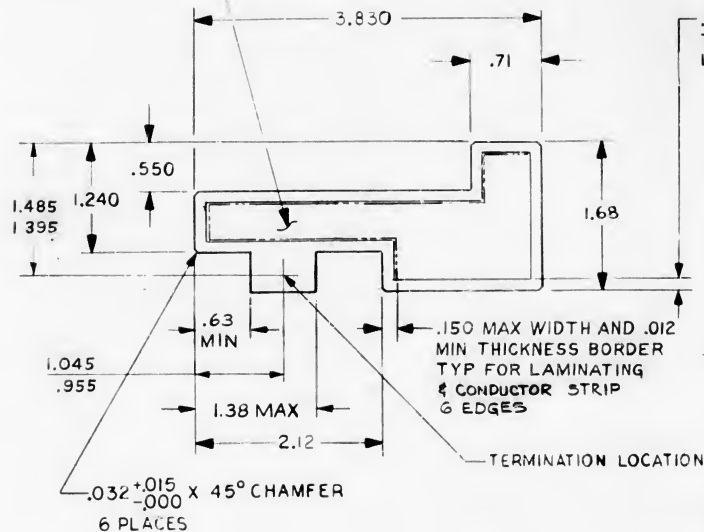
A

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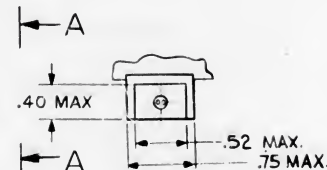
REVISIONS

| REV | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
|-----|------|---|----|-----|-----------|----------|
| C | | REPLACES REV B WITH CHANGE PER TDRR 35494 | B | SW | 21 FEB 68 | |
| D | | REVISED PER TDRR 35542 | LK | YH | 6 MAR 68 | |
| E | | REVISION STATUS CHANGED | JJ | DP | 16 APR 68 | |

ALL AREA INSIDE LAMINATED BORDER TO BE ELECTRO-LUMINESCENT, THIS SIDE



.120 MAX WIDTH AND .012 MIN THICKNESS BORDER TYP FOR LAMINATING 2 EDGES



PARTIAL VIEW A-A

SEE PARTIAL VIEW A-A AND FIGURE 11 (SHEET 11)

FIGURE 2

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|--|-------------------------|---|-----------------------------|------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>W. Knolly</i> | 26 June 67 | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>R. Bogue</i> | 27 June 67 | | | |
| APPROVED <i>CR. Brown</i> | 27 June 67 | | | |
| APPROVED <i>11459-497</i> | 100-2347 | | | |
| APPROVED <i>see</i> | | CODE IDENT NO | SIZE | DRAWING NO |
| APPROVED MSC | | 80230 | C | 1008944 |
| DATE | | SCALE | SHEET 3 OF | |

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μ F
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
2 PLC DEC 3 PLC DEC ANGLES
 $\pm .02$ $\pm .015$ $\pm 5^\circ$
DO NOT SCALE THIS DRAWING

MATERIAL

SEE NOTES

NEXT ASSY USED ON

APPLICATION

1008944 E

B

A

1

□



E

A

1

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D

C

B

A

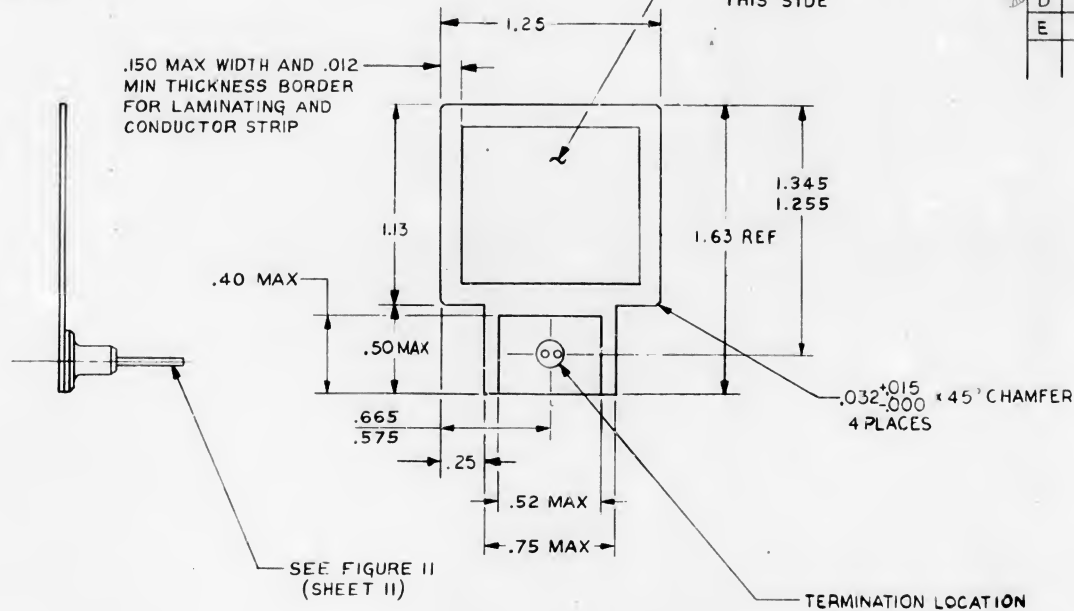


FIGURE 4

| REVISIONS | | | | | | |
|-----------|------|---|----|------|-----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| C | | REPLACES REV B WITH CHANGE PER TDRR 35494 | B | LK | 22 FEB 68 | |
| D | | REVISION STATUS CHANGED | LK | 1/1 | 6 MAY 68 | |
| E | | REVISION STATUS CHANGED | JJ | 23 P | 6 APR 68 | |

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| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | |
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| | | |
| MATERIAL | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO |
|--|---------------------------------------|---|-----------------------------|------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN W. Knoll 26 June 67 | CHECKED R. R. R. R. 27 June 67 | LAMP. ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| APPROVED N. S. 9-497 | APPROVED R. R. R. R. 27 June 67 | CODE IDENT NO | SIZE | DRAWING NO |
| APPROVED MIT | APPROVED MSC | 80230 | C | 1008944 |
| DATE | SCALE | SHEET 5 OF | | |

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2

1

NOTICE: WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY OMISSION, MISSTATEMENT, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED AS IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSE THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

| REVISIONS | | | | | | |
|-----------|------|---|-----|------|-----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| C | | REPLACES REV 8 WITH CHANGE PER TDDR 35494 | B. | LW | 22 FEB 68 | |
| D | | REVISION STATUS CHANGED | LK | V.H. | 6 MAR 68 | |
| E | | REVISION STATUS CHANGED | JJJ | REP | 16 APR 68 | |

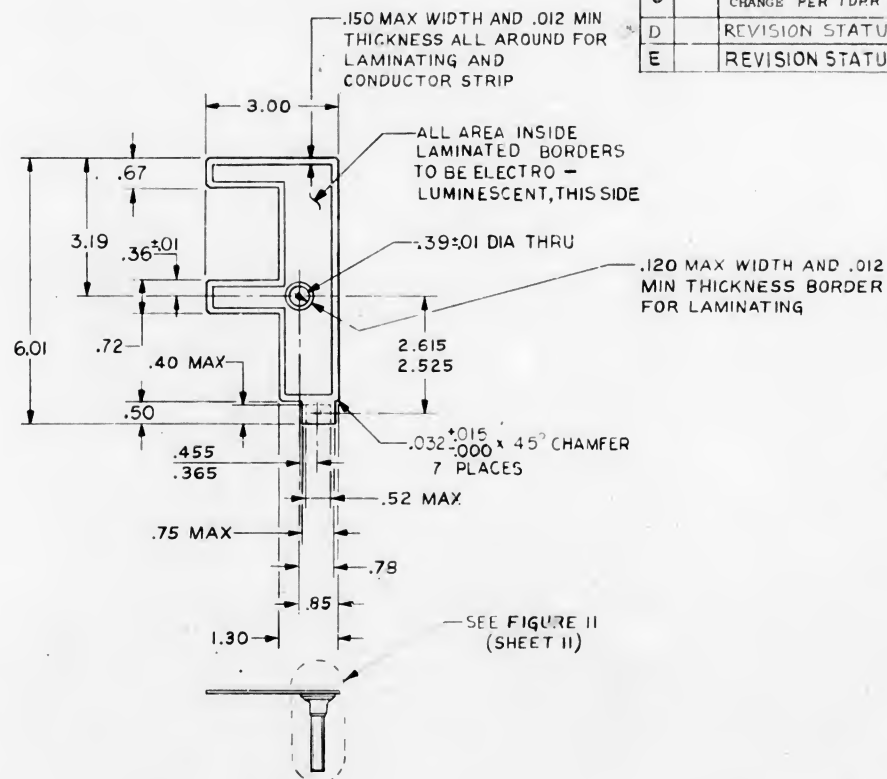


FIGURE 5

| | | | | |
|--|------------------------|--|-----------------------------|------------|
| QTY REQD | PART OR IDENTIFYING NO | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>W. Knoll</i> | | 26 JUN 67 | | |
| CHECKED <i>R. Hogue</i> | | 27 JUN 67 | | |
| APPROVED <i>C.R. Jones</i> | | 27 JUN 67 | | |
| APPROVED <i>NA 59-497</i> | | | | |
| APPROVED <i>David Wolan</i> | | APR 23 67 | | |
| MIT | | CODE IDENT NO | SIZE | DRAWING NO |
| APPROVED: <i>W.H.</i> | | 80230 | C | 1008944 |
| DATE | | SCALE | SHEET 6 OF | |

| | | | |
|--|---------|--|--|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 DEC DEC 3 DEC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING | | | |
| MATERIAL | | | |
| SEE NOTES | | | |
| NEXT ASSY | USED ON | | |
| APPLICATION | | | |

1008944 E B

A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONFIRMING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

| REVISIONS | | | | | |
|-----------|------|---|----|------|-----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE |
| C | | REPLACES REV B WITH CHANGE PER TDRR 35494 | B | lw | 22 FEB-69 |
| D | | REVISED PER TDRR 35542 | LK | 1/11 | 5 MAR 69 |
| E | | REVISION STATUS CHANGED | JJ | EXP | 16 APR 69 |

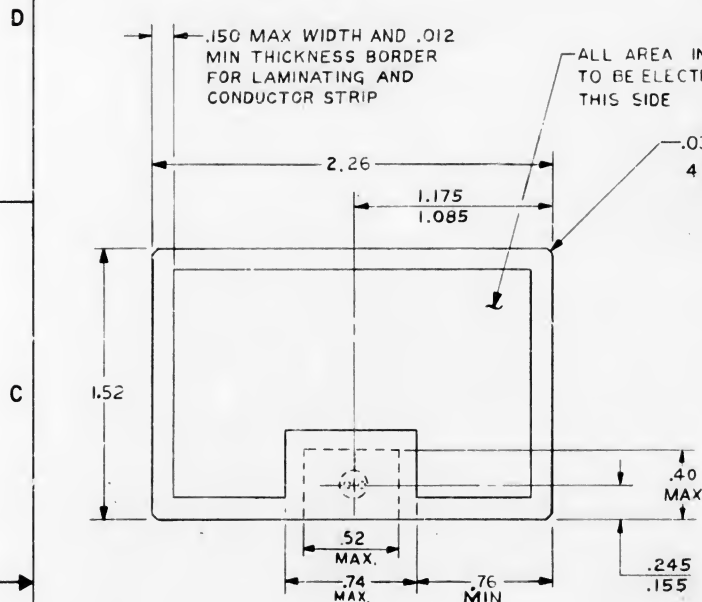


FIGURE 6

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO |
|---|------------------------|---|-----------------------------|------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON TEXAS | | |
| DRAWN <i>W Knoll</i> | 26 JUN 68 | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>R. R. R. R.</i> | 27 JUN 68 | | | |
| APPROVED <i>CR. R. R.</i> | 27 JUN 68 | | | |
| APPROVED <i>NAS 9-497</i> | | | | |
| APPROVED MIT | 100 25, 67 | CODE IDENT NO | SIZE | DRAWING NO |
| APPROVED MSC | | 80230 | C | 1008944 |
| DATE | | SCALE | SHEET 7 OF | |

1008944

| REVISIONS | | | | | | |
|-----------|------|---|----|------|-------------------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| C | | REPLACES REV B WITH CHANGE, PER TORR 35494 | B. | fw | 22- FEB- 68 | |
| D | | REVISION STATUS CHANGED | LK | 1/14 | 6 MAR 68 | |
| E | | REVISION STATUS CHANGED | JJ | GP | 16 APR 68 | |

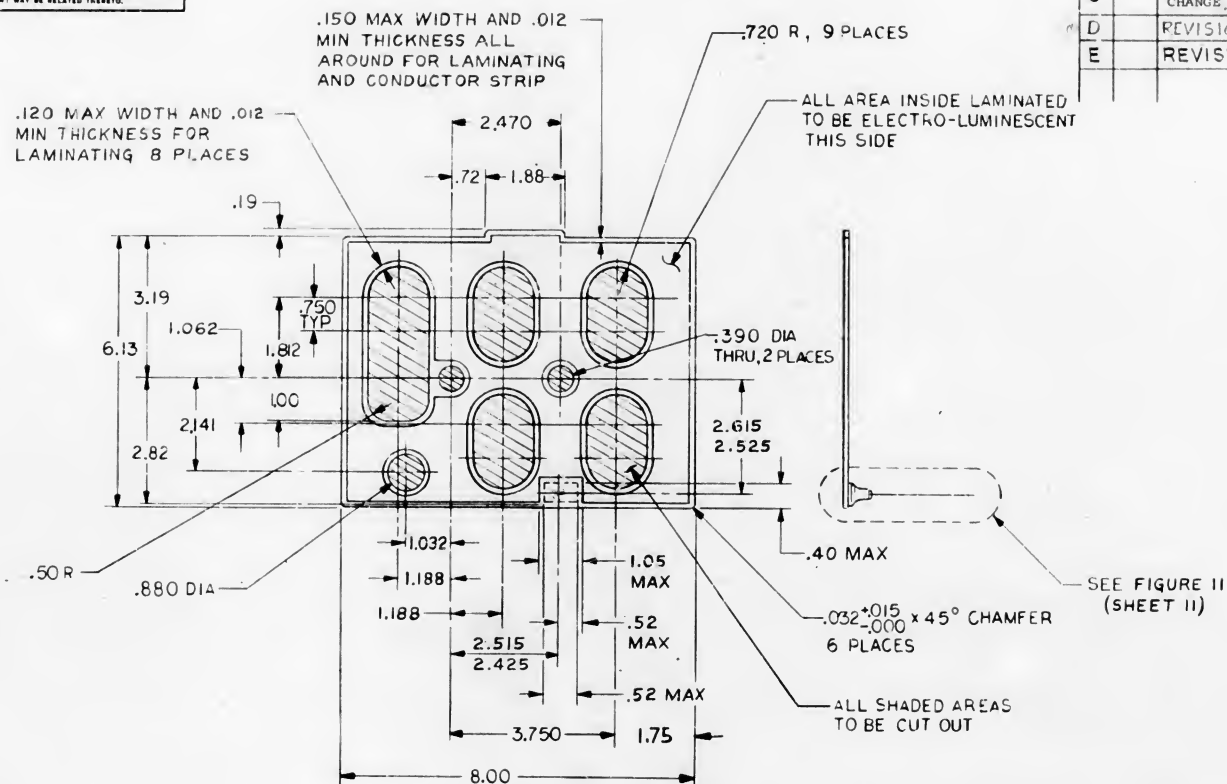


FIGURE 7

| | | | | | |
|---|----------------------------|--|--------------------------------|------------|-----|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | | NO. |
| LIST OF MATERIALS | | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | | |
| DRAWN <i>W. Knoll</i> | <i>27-10-62</i> | LAMP ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | | |
| CHECKED <i>P. Rutledge</i> | <i>27-10-62</i> | | | | |
| APPROVED <i>CP Jones</i> | <i>27-10-62</i> | | | | |
| APPROVED | | | | | |
| <i>RA 59-497</i> | | CODE IDENT NO | SIZE | DRAWING NO | |
| APPROVED MIT | <i>Nov 23 62</i> | 80230 | C | 1008944 | |
| APPROVED MSC | <i>[Signature]</i> | DATE | SCALE | SHEET 8 OF | |

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| REVISIONS | | | | | | |
|-----------|------|---|----|-----|-----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| C | | REPLACES REV B WITH CHANGE PER TDRR 35494 | R. | FW | 23-FEB-62 | |
| D | | REVISION STATUS CHANGED | LK | FW | 6 MAY 62 | |
| E | | REVISION STATUS CHANGED | J | FW | 6 APR 63 | |

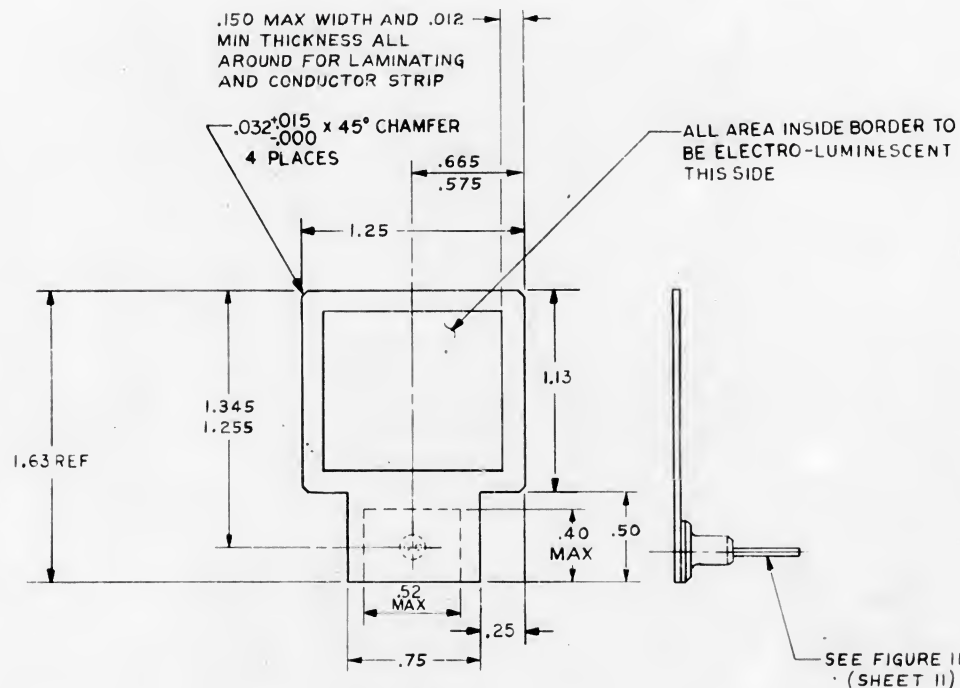


FIGURE 8

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | |
| | | |
| | | |
| | | |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO |
|---|-------------------------|--|-----------------------------|------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>W. Kull</i> CHECKED <i>P. R. Brown</i> APPROVED <i>P. R. Brown</i> | | LAMP ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| APPROVED <i>W. Kull</i> MIT | | DRAWING NO 1008944 | | |
| APPROVED <i>W. Kull</i> MSC | | CODE IDENT NO 80230 | SIZE C | SHEET 9 OF |
| DATE | | SCALE | | |

| REVISIONS | | | | | | |
|-----------|------|--|----|-----|--------------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| C | | REPLACES REV B WITH CHANGE PER TDRR 35494 | B. | SW | 23 FEB 68 | |
| D | | REVISION STATUS CHANGED | LK | ✓ W | 6 MAR 68 | |
| E | | REVISION STATUS CHANGED | JJ | ESP | 16 APR 68 | |



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| | |
| NEXT ASSY | USED ON |
| APPLICATION | |

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μ F
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
2 PLC DEC 3 PLC DEC ANGLES
 $\pm .02$ $\pm .005$ $\pm 5^\circ$
DO NOT SCALE THIS DRAWING

| MATERIAL | |
|----------|-----|
| 1 | 100 |
| 2 | 100 |
| 3 | 100 |
| 4 | 100 |
| 5 | 100 |
| 6 | 100 |
| 7 | 100 |
| 8 | 100 |
| 9 | 100 |
| 10 | 100 |
| 11 | 100 |
| 12 | 100 |
| 13 | 100 |
| 14 | 100 |
| 15 | 100 |
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| 17 | 100 |
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| 83 | 100 |
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| 85 | 100 |
| 86 | 100 |
| 87 | 100 |
| 88 | 100 |
| 89 | 100 |
| 90 | 100 |
| 91 | 100 |
| 92 | 100 |
| 93 | 100 |
| 94 | 100 |
| 95 | 100 |
| 96 | 100 |
| 97 | 100 |
| 98 | 100 |
| 99 | 100 |
| 100 | 100 |

SEE NOTES

| | | | | | |
|---|----------------------------|----------------------|--|------|------------|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | | NO. |
| LIST OF MATERIALS | | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | | MANNED SPACECRAFT CENTER - HOUSTON, TEXAS | | |
| DRAWN | <i>W. Knell</i> | <i>26 JUN 67</i> | LAMP | | |
| CHECKED | <i>R. Hogue</i> | <i>27 JUN 67</i> | ELECTRO-LUMINESCENT | | |
| APPROVED | <i>CR. Brown</i> | <i>28 JUN 67</i> | SPECIFICATION CONTROL DRAWING | | |
| APPROVED | | | | | |
| APPROVED MIT | <i>NAS 9-497</i> | <i>26 JUN 67</i> | CGJE IDENT NO | SIZE | DRAWING NO |
| APPROVED MSC | <i>7549</i> | <i>28 JUN 67</i> | 80230 | C | 1008944 |
| | DATE | SCALE | SHEET 10 OF | | |

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A SPECIFICALLY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, PROVIDED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREBY.

| REVISIONS | | | | | | |
|-----------|------|---|----|-----|-----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| C | | REPLACES REV B WITH CHANGE PER TDRR 35494 | B. | 2W | 23 FEB 68 | |
| D | | REVISION STATUS CHANGED | LK | VH | 6 MAR 68 | |
| E | | REVISION STATUS CHANGED | JJ | EA | 6 APR 68 | |

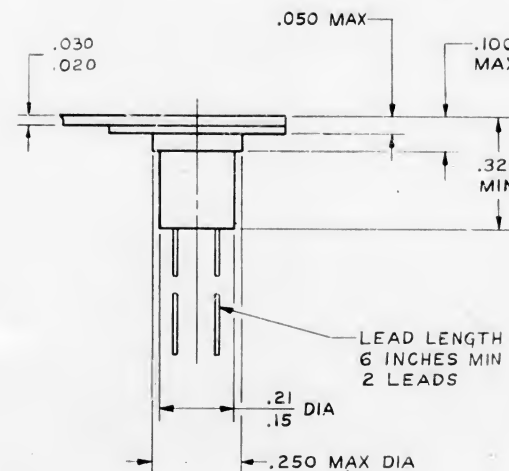
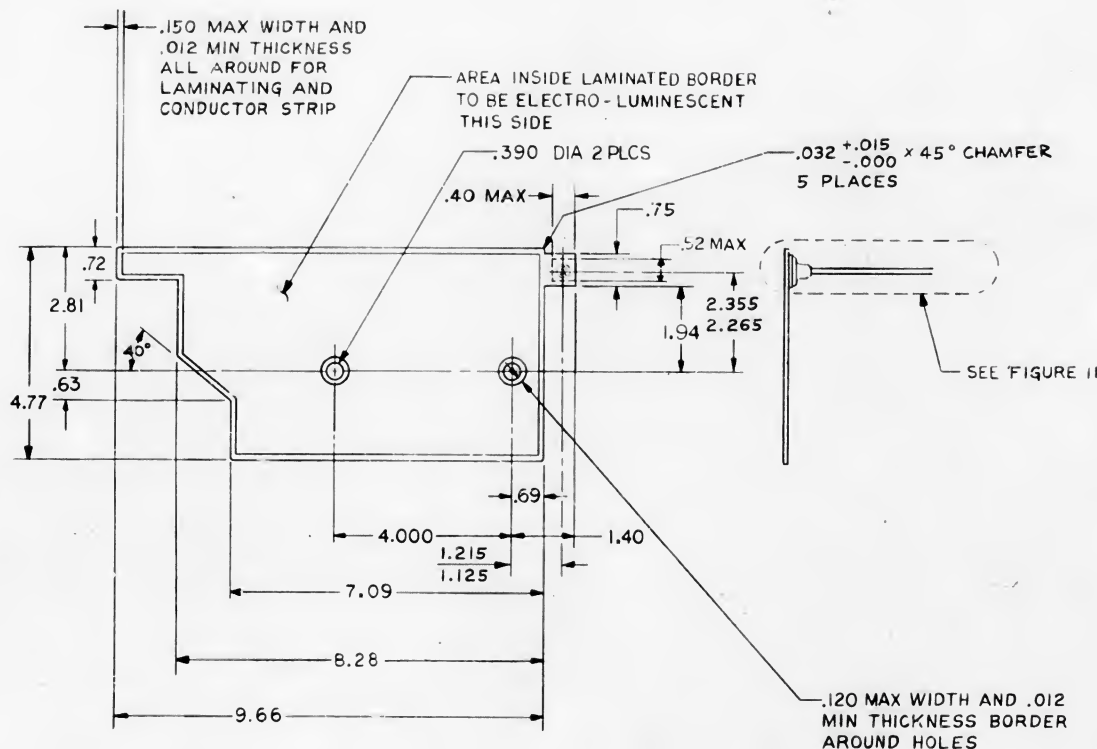


FIGURE 11

TOP HAT (LEAD TERMINATION) CONFIGURATION (APPLICABLE TO ALL DASH NUMBER)

FIGURE 10

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO |
|---|-------------------------|--|-----------------------------|-------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN W. Knoll | | LAMP | | |
| CHECKED R. Bogue | | ELECTRO-LUMINESCENT | | |
| APPROVED R. Bogue | | SPECIFICATION CONTROL DRAWING | | |
| APPROVED NAS 9-497 | | | | |
| APPROVED MIT | | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC | | 80230 | C | 1008944 |
| DATE | | SCALE | SHEET 11 OF | |

| | |
|--|---------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC. 3 PLC DEC. ANGLES $\pm .02$ $\pm .010$ $\pm 2^\circ$ DO NOT SCALE THIS DRAWING | |
| MATERIAL SEE NOTES | |
| NEXT ASSY | USED ON |
| APPLICATION | |

1008944

B

A

REQUIREMENTS: (CONTINUED)

B. ELECTRICAL AND PHOTOMETRIC PROPERTIES:

- (1) TRANSIENT VOLTAGE: THE LAMP SHALL BE EXCITED WITH 160 ± 5 VOLTS RMS 400 HZ, FOR 5 SECONDS MINIMUM. AFTER APPLICATION OF THIS VOLTAGE THE LAMP MUST BE CAPABLE OF MEETING THE OTHER REQUIREMENTS OF SECTION B.
- (2) LIGHT INTENSITY: 1.2 TO 2.0 FOOT-LAMBERTS INITIALLY WHEN EXCITED WITH 75 ± 1.0 VOLTS RMS, 400 ± 10 HZ.
- (3) CURRENT: PER TABLE 1, WHEN EXCITED PER 2.B.(2).
- (4) POWER: PER TABLE 1, WHEN EXCITED PER 2.B.(2).
- (5) LIGHT OUTPUT COLOR: THE LIGHT OUTPUT COLOR SHALL BE AS SPECIFIED IN 3.F.(1).
- (6) DC INSULATION RESISTANCE: THE LEADS OF THE LAMP SHALL BE CONNECTED TOGETHER AND THE LAMP IMMersed IN A 1% SOLUTION OF SALT WATER. THE DC RESISTANCE MEASURED BETWEEN THE LEADS AND THE WATER SHALL NOT BE LESS THAN 10 MEGOHMS.

3. DESIGN

- A. OPERATING LIFE: 2000 HOURS MINIMUM AT 25°C AND A RELATIVE HUMIDITY LESS THAN 70% WITH A LOSS OF NOT MORE THAN 90% OF ORIGINAL LIGHT INTENSITY. MEASUREMENTS ACCOMPLISHED WHEN EXCITED PER 2.B.(2) AT 25°C.
- B. STORAGE LIFE: 1 YEAR MINIMUM WITHOUT LOSS OF ELECTRICAL PERFORMANCE AT 0° TO +65°C. LAMP SHALL BE PACKAGED AS SPECIFIED PER PARAGRAPH 1.E. NOTE: STORAGE AT ELEVATED TEMPERATURES WILL CAUSE DIMENSIONAL CHANGES.
- C. OPERATING TEMPERATURE RANGE: -55°C TO +65°C. ACCELERATED LIFE DEGRADATION IS NOTED WITH OPERATION ABOVE 25°C.
- D. SEAL: THE LAMPS SHALL BE SUBJECTED TO THE IMMERSION TEST (CONDITION B) SPECIFIED IN MIL-STD-2020. THE LIGHT INTENSITY OF PARAGRAPH 2.B.(2) AND THE DC INSULATION RESISTANCE OF PARAGRAPH 2.B.(6) SHALL BE CHECKED AFTER THE IMMERSION AS ACCEPTANCE CRITERIA.
- E. MATERIAL:
 - (1) FLUOROHALOCARBON FILL ENCAPSULATED ELECTRO-LUMINESCENT LAMP.
 - (2) THE LEAD INSULATION SHALL BE CHEMICALLY TREATED IN A MANNER TO ALLOW ADHESIVE BONDING OR POTTING AND ALLOW THE UNIT TO MEET THE IMMERSION TEST REQUIREMENT OF 3.D.
NOTE: ETCHED TEFLON HAS LIMITED SHELF LIFE WHEN EXPOSED TO LIGHT IN THE PRESENCE OF AIR. THE BONDING STRENGTH OF THE ETCHED TEFLON MATERIAL TO THE NON-ETCHED TEFLON BASE IS THEREBY GREATLY REDUCED.
 - (3) THE ENCAPSULATED LEADS SHALL BE ALUMINUM FOIL AND SHALL BE ELECTRICALLY CONNECTED TO THE ALUMINUM PLATE AND EXTERNAL LEAD WIRES WITH A CONDUCTIVE CEMENT.
 - (4) NO MATERIAL SHALL BE USED AS AN OVERCOAT OR PROTECTIVE COVERING TO INSURE AN ADEQUATE SEAL OR PROTECTION.
- F. RATING:
 - (1) LIGHT OUTPUT COLOR: $x = 0.33 \pm 0.02$, $y = 0.33 \pm 0.02$ PER CIE DIAGRAM.
 - (2) MAXIMUM CONTINUOUS VOLTAGE: 120 V RMS, 400 HZ.
 - (3) UNIFORMITY OF LIGHT INTENSITY: THE LIGHT INTENSITY SHALL BE UNIFORM OVER THE FACE OF THE LAMP WITHIN 10%.

| REVISIONS | | | | |
|-----------|-----|---|-----------|----------|
| ZONE | LTR | DESCRIPTION | DATE | APPROVED |
| | C | REPLACES REV B WITH CHANGE PER TDRR 35494 | 23 FEB 69 | B |
| | D | REVISED PER TDRR 35542 | 6 MAR 69 | LK |
| | E | REVISION STATUS CHANGED | 16 APR 69 | JJJ |

| | | | | | |
|---|---------------------|---|--|--|-------------------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | M.I.T. INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON TEXAS | |
| 2 PLACE DECIMALS | 3 PLACE DECIMALS | DRAWN <u>KNOLL</u> 26-JUN-67 DATE | | LAMP ELECTRO-LUMINESCENT | |
| + | + | CHECKED <u>HOGUE</u> 27-JUN-67 | | | |
| - | - | APPROVAL <u>CRAMER</u> 27-JUN-67 | | | |
| DO NOT SCALE THIS DRAWING | | CONTRACT <u>NAS9-497</u> | | SPECIFICATION CONTROL DRAWING | |
| MATERIAL | | AC MIT NASA APPROVAL <u>13-SEP-67</u> WATSON MIT APPROVAL <u>23-AUG-67</u> | | SIZE C | CODE IDENT NO 80230 |
| APPROVAL | | | | SCALE | 1008944 |
| | | | | | SHEET 12 |

REQUIREMENTS: (CONTINUED)

- (4) UNIFORMITY OF LIGHT OUTPUT COLOR: THE LIGHT OUTPUT COLOR SHALL BE UNIFORM OVER THE FACE OF THE LAMP WITHIN THE TOLERANCE SPECIFIED IN 3.F.(1).

4. SPECIAL CONDITIONING BY MANUFACTURER:

- A. ALL LAMPS SHALL BE BURNED-IN FOR A PERIOD OF 50 TO 100 HOURS PRIOR TO THE ACCEPTANCE AND INSPECTION TESTS IN 2.B. ABOVE. THE BURN-IN CONDITIONS SHALL BE AS FOLLOWS:
- (1) TEMPERATURE: $25^{\circ} \pm 5^{\circ}\text{C}$ AND A RELATIVE HUMIDITY LESS THAN 70%.
 - (2) OPERATING VOLTAGE: $115 \pm 10\text{V RMS}$, $60 \pm 5\text{ Hz}$ FOR THE FIRST 50 HOURS, AND 120 V RMS , $400 \pm 10\text{ Hz}$ FOR REMAINDER OF BURN-IN.

| REVISIONS | | | |
|-----------|-----|---|-----------|
| ZONE | LTR | DESCRIPTION | DATE |
| | C | REPLACES REV B WITH CHANGE PER TORR 35494 | 23 FEB 68 |
| | D | REVISION STATUS CHANGED | 6 MAR 68 |
| | E | REVISION STATUS CHANGED | 16 APR 68 |

| TABLE I | | | |
|----------|--------|-----------------------------|--------------------|
| DASH NO. | FIGURE | CURRENT-MAX MILLIAMPERES | POWER-MAX WATTS |
| -001 | 1 | 80 | 1.560 |
| -002 | 2 | 5 | .096 |
| -003 | 3 | 6 | .104 |
| -004 | 4 | 2 | .032 |
| -005 | 5 | 17 | .268 |
| -006 | 6 | 5 | .088 |
| -007 | 7 | 50 | .960 |
| -008 | 8 | 2 | .032 |
| -009 | 9 | 1 | .016 |
| -010 | 10 | 70 | 1.400 |

| | | | | | |
|---|---------------------|--|-------------------------------|--|-----------------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | MIT INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON TEXAS | |
| 2 PLACE DECIMALS | 3 PLACE DECIMALS | ANGLES | DRAWN <u>KNOLL</u> | DATE <u>26 JUN-67</u> | LAMP ELECTRO-LUMINESCENT |
| + | + | + | CHECKED <u>HOQUE</u> | DATE <u>27 JUN-67</u> | |
| - | - | - | APPROVAL <u>CRAMER</u> | DATE <u>27 JUN-67</u> | |
| DO NOT SCALE THIS DRAWING | | | CONTRACT <u>NAS9-497</u> | | |
| MATERIAL | | | SPECIFICATION CONTROL DRAWING | | |
| APPROVAL | | | SIZE CODE IDENT NO | | |
| A C MIT NASA APPROVAL | | | C 80230 | | |
| P WATSON 23-AUG-67 MIT APPROVAL | | | 1008944 | | |
| SCALE | | | SHEET 13 | | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY INDICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFERRING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL, ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

NOTES:

1. GENERAL REQUIREMENTS:

- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- THIS WIRE SHALL COMPLETELY CONFORM TO MIL-W-16878/4 WITH THE PARTICULAR PROPERTIES SPECIFIED BELOW. LENGTH MAY BE AN EXCEPTION AS SPECIFIED.
- QUALITY ASSURANCE SHALL BE PER MIL-W-16878/4.
- QUALIFICATION NOT REQUIRED.
- MARKING PER MIL-STD-129 FOR REELS AND SHIPPING CONTAINERS SHALL INCLUDE THE ITEM DESCRIPTION, MIL SPEC IDENTITY AND TYPE NUMBER, COLOR, MANUFACTURER'S NAME AND/OR SYMBOL, AND NASA DRAWING AND DASH NUMBER PLUS REVISION LETTER.

2. ACCEPTANCE AND INSPECTION REQUIREMENTS:

A. MECHANICAL PROPERTIES:

- MATERIAL: SILVER PLATED COPPER CONDUCTOR WITH AN INSULATION OF POLYTETRAFLUOROETHYLENE (TFE).
- COLOR, INSULATION: SEE TABLE I FOR SOLID COLORS WITH NO STRIPE. MIL-STD-104 FOR COLOR LIMITS. TABLE II FOR SOLID COLORS WITH TRACER TABLE III SOLID COLOR WITH ONE OR MORE STRIPES
- LENGTH: 500 FOOT REELS SUCH THAT EACH REEL MAY BE DISCONTINUOUS. EACH LENGTH WOUND ON THE REEL SHALL BE 100 FEET MINIMUM WITH ENDS IDENTIFIED AND LEFT ACCESSIBLE.

B. ELECTRICAL CHARACTERISTICS (MIL SPEC REFERENCE):

- DC RESISTANCE (OHMS/1000 FT.): 69 MAXIMUM.
- SPARK TEST: 3.4 KILOVOLTS.
- DIELECTRIC STRENGTH: 2.0 KILOVOLTS MINIMUM.
- INSULATION RESISTANCE: 5000 MEGOHMS/1000 FEET, MINIMUM.
- DIELECTRIC CONSTANT: 2.2 MAXIMUM.
- POWER FACTOR: 0.005 MAXIMUM.
- SURFACE RESISTANCE: 5 MEGOHMS MINIMUM.

3. DESIGN REQUIREMENTS:

- ENVIRONMENTAL, TEMPERATURE RANGE: -65°C TO +200°C.
- VOLTAGE RATING 600 VRMS.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

1010416

REVISIONS 8 00803 4-10-63

| SYM | DESCRIPTION | DATE | APPROVAL |
|-----|--|----------|----------|
| A | UPGRADED TO CLASS A RELEASE PER TDRR 00858 | 1/24/63 | W/H |
| B | REVISED PER TDRR 01772 | 6-26-63 | W/H |
| C | REVISED PER TDRR 13433 | 11-12-64 | W/H |
| D | REVISED PER TDRR 16343 | 2/27/65 | W/H |

TABLE II

TRACER & DASH NO.

| BASIC COLOR | BLACK NO. 26 | BROWN NO. 26 | RED NO. 26 | ORANGE NO. 26 | YELLOW NO. 26 | GREEN NO. 26 | BLUE NO. 26 | VIOLET NO. 26 | GRAY NO. 26 | WHITE NO. 26 |
|-------------|--------------|--------------|------------|---------------|---------------|--------------|-------------|---------------|-------------|--------------|
| BLACK | - | 120 | -129 | -138 | -147 | -156 | -165 | -174 | -183 | -192 |
| BROWN | -111 | - | -130 | -139 | -148 | -157 | -166 | -175 | -184 | -193 |
| RED | -112 | 121 | - | -140 | -149 | -158 | -167 | -176 | -185 | -194 |
| ORANGE | -113 | 122 | -131 | - | -150 | -159 | -168 | -177 | -186 | -195 |
| YELLOW | -114 | 123 | -132 | -141 | - | -160 | -169 | -178 | -187 | -196 |
| GREEN | -115 | 124 | -133 | -142 | -151 | - | -170 | -179 | -188 | -197 |
| BLUE | -116 | 125 | -134 | -143 | -152 | -161 | - | -180 | -189 | -198 |
| VIOLET | -117 | 126 | -135 | -144 | -153 | -162 | -171 | - | -190 | -199 |
| GRAY | -118 | 127 | -136 | -145 | -154 | -163 | -172 | -181 | - | -200 |
| WHITE | -119 | 128 | -137 | -146 | -155 | -164 | -173 | -182 | -191 | - |

TABLE I

| INSULATION COLOR (SOLID) | DASH NO. (NO. 28 AWG) .039 DIA MAX E28 | DASH NO. (NO. 26 AWG) .043 DIA MAX E26 | DASH NO. (NO. 22 AWG) E22 |
|--------------------------|--|--|---------------------------|
| BLACK | -1 | -11 | -21 |
| BROWN | -2 | -12 | -22 |
| RED | -3 | -13 | -23 |
| ORANGE | -4 | -14 | -24 |
| YELLOW | -5 | -15 | -25 |
| GREEN | -6 | -16 | -26 |
| BLUE | -7 | -17 | -27 |
| VIOLET | -8 | -18 | -28 |
| GREY | -9 | -19 | -29 |
| WHITE | -10 | -20 | -30 |

| | | | |
|--|-------------------------|---|-----------------------------|
| QTY REQ | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>W. J. [Signature]</i> DATE 3/24/63 CHECKED <i>W. J. [Signature]</i> DATE 4/1/63 APPROVAL <i>W. J. [Signature]</i> DATE 4/1/63 APPROVAL | | WIRE, ELECTRICAL, STRANDED, INSULATED SPECIFICATION CONTROL DRAWING | |
| NASA APPROVAL <i>W. J. [Signature]</i> DATE 4/1/63 MIT APPROVAL <i>W. J. [Signature]</i> DATE 4/1/63 | | CODE IDENT NO. SIZE C | NASA DRAWING NO. 1010416 |
| APPLICATION | | SCALE NONE WT | SHEET 1 OF 2 |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A SPECIFICALLY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFERRING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
|-----|------|---------------------------------|----|-----|---------|----------|
| D | | THIS SHEET ADDED PER TDRR 16343 | | | 2/24/65 | WR |

TABLE III (#28E SIZE WIRE)

| DASH NO. | COLOR | | |
|----------|-------|------------|------------|
| | BASIC | 1ST STRIPE | 2ND STRIPE |
| 300 | WHITE | BLACK | ---- |
| 301 | WHITE | BROWN | ---- |
| 302 | WHITE | RED | ---- |
| 303 | WHITE | ORANGE | ---- |
| 304 | WHITE | YELLOW | ---- |
| 305 | WHITE | GREEN | ---- |
| 306 | WHITE | BLUE | ---- |
| 307 | WHITE | VIOLET | ---- |
| 308 | WHITE | GRAY | ---- |
| 309 | WHITE | BLACK | BROWN |
| 310 | WHITE | BLACK | RED |
| 311 | WHITE | BLACK | ORANGE |
| 312 | WHITE | BLACK | YELLOW |
| 313 | WHITE | BLACK | GREEN |
| 314 | WHITE | BLACK | BLUE |
| 315 | WHITE | BLACK | VIOLET |
| 316 | WHITE | BLACK | GRAY |
| 317 | WHITE | BROWN | RED |
| 318 | WHITE | BROWN | ORANGE |
| 319 | WHITE | BROWN | YELLOW |
| 320 | WHITE | BROWN | GREEN |
| 321 | WHITE | BROWN | BLUE |
| 322 | WHITE | BROWN | VIOLET |
| 323 | WHITE | BROWN | GRAY |

(D) THIS SHEET ADDED

| | | | | |
|---|-------------------------|--|-----------------------------|--------------|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>A. Addison</i> 10/5/65 | | WIRE, ELECTRICAL | | |
| CHECKED <i>G. Mayo</i> 2-24-65 | | STRANDED, INSULATED | | |
| APPROVED <i>G. Mayo</i> 2-24-65 | | SPECIFICATION CONTROL DRAWING | | |
| APPROVED MIT <i>W. R. Taylor</i> 2/24/65 | | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC | | C | | 1010416 |
| DATE | | SCALE | NONE | SHEET 2 OF 2 |
| APPLICATION | | | | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PURCHASE OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE SUBMITTED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONFERRING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS, AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

MARKING: PACKAGES SHALL BE MARKED WITH THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

INSPECTION AND ACCEPTANCE:

COLOR: NATURAL CREAM

DIMENSIONS: PER FIGURE

DESIGN REQUIREMENTS:

MATERIAL: NYLON PER MIL-P-17091, TYPE 1

THREADS: PER MIL-S-7742

TABLE I

| D | DIMENSIONS | | | | | | | | | |
|------|------------|------|------|------|------|------|------|------|------|------|
| | A | | F | | H | | J | | T | |
| | MAX | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | MIN |
| .086 | .140 | .124 | .083 | .070 | .062 | .055 | .031 | .023 | .037 | .025 |
| .112 | .183 | .166 | .107 | .091 | .079 | .072 | .039 | .031 | .048 | .035 |
| .138 | .226 | .208 | .132 | .118 | .096 | .089 | .048 | .039 | .060 | .045 |
| .164 | .270 | .250 | .156 | .141 | .113 | .106 | .054 | .045 | .071 | .054 |

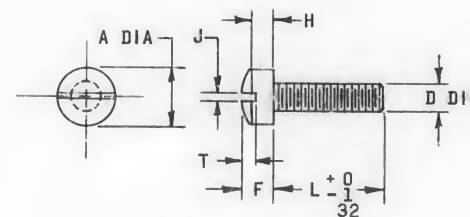
TABLE II

| DASH NUMBERS | | | | | | | | | | | | | | |
|--------------|-----------|-----|------|-----|------|-----|------|-----|------|-----|-----|-----|-----|--|
| LENGTH "L" | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 9/16 | 5/8 | 3/4 | 7/8 | 1 | |
| D | SIZE THDS | | | | | | | | | | | | | |
| .086 | 2 56 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 58 | 62 | 66 | |
| .112 | 4 40 | 96 | 98 | 100 | 102 | 104 | 106 | 108 | 110 | 112 | 116 | 120 | 124 | |
| .138 | 6 32 | 185 | 187 | 189 | 191 | 193 | 195 | 197 | 199 | 201 | 205 | 209 | 213 | |
| .164 | 8 32 | | 235 | 237 | 239 | 241 | 243 | 245 | 247 | 249 | 253 | 257 | 261 | |

PART NUMBER IS DRAWING NUMBER PLUS APPLICABLE DASH NUMBER, E.G. 1010485-189 IS A NO. 6 SCREW, 1/4 LONG.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | | | |
|--|--|---|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± DO NOT SCALE THIS DRAWING MATERIAL SEE NOTES HEAT TREATMENT NONE NEXT ASSY USED ON APPLICATION | |
| | | FINISH NONE | |



DUPLICATE MASTER FOR NEGOTIATION ONLY

| | | | |
|--|-------------------------|--|------------------------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| M.I.T. INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>J. Parbo</i> DATE <i>11 JUN 63</i> CHECKED <i>Wilson</i> DATE <i>12 JUN 63</i> APPROVAL <i>By G. MAY 63</i> APPROVAL | | SCREW-NYLON FILLISTER HEAD COARSE HEAD THREADED SPECIFICATION CONTROL DRAWING | |
| NASA APPROVAL <i>K. J. ...</i> MIT APPROVAL <i>W. J. ...</i> | | CODE IDENT NO. <i>C</i> | NASA DRAWING NO. 1010485 |
| SCALE <i>NONE</i> | | WT | SHEET 1 OF 1 |

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REQUIREMENTS:

GENERAL:

INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

SCREWS SHALL BE BURR FREE.

SCREWS SHALL MEET THE PERFORMANCE REQUIREMENTS AS OUTLINED

IN MIL-F-18240.

PACKAGES SHALL BE MARKED WITH THE NASA DRAWING NO. DASH NO. AND REV. LETTER.

INSPECTION AND ACCEPTANCE:

MATERIAL: 18-8 OR 16-18 CORROSION RESISTANT STEEL, PER QQ-S-763 OR PER FF-S-86 (75,000 PSI MIN. ULT. TEN. STR.)

FINISH: PASSIVATE PER MIL-F-14072, E300.

INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE-B

THREADS SHALL BE IN ACCORDANCE WITH MIL-S-7742.

| PART NO. | THREAD SIZE | A SEE NOTE 1 | B DIM | | C DIM | | D DIM | | E DIM |
|----------|-------------|--------------------|-------|------|-------|------|-------|-------|-------|
| | | | MIN | MAX | MIN | MAX | MIN | MAX | |
| 1 | 2-56NC-3A | .187 | .154 | .164 | .038 | .046 | .0500 | .0510 | 0.028 |
| 2 | | .250 | | | | | | | |
| 3 | | .312 | | | | | | | |
| 4 | | .375 | | | | | | | |
| 5 | | .437 | | | | | | | |
| 6 | | .500 | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | 4-40NC-3A | .187 | .201 | .213 | .051 | .059 | .0625 | .0635 | 0.035 |
| 13 | | .250 | | | | | | | |
| 14 | | .312 | | | | | | | |
| 15 | | .375 | | | | | | | |
| 16 | | .437 | | | | | | | |
| 17 | | .500 | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | 6-32NC-3A | .187 | .250 | .262 | .063 | .073 | .0781 | .0791 | 0.044 |
| 24 | | .250 | | | | | | | |
| 25 | | .312 | | | | | | | |
| 26 | | .375 | | | | | | | |
| 27 | | .437 | | | | | | | |
| 28 | | .500 | | | | | | | |
| 29 | 6-32UNC-3A | 1.250 | .250 | .262 | .063 | .073 | .0781 | .0791 | 0.044 |

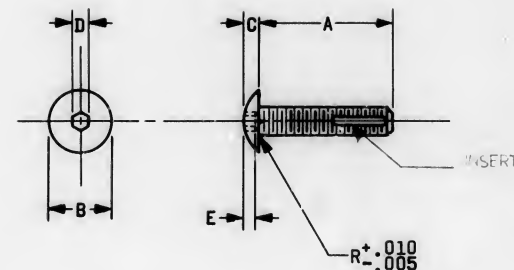
NOTE 1: TOLERANCE ON "A" DIMENSION

(A) 1.00 OR LESS = $\pm .016$

(B) ABOVE 1.00 = $\pm .031$
 $\pm .016$

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | | | |
|-------------|---------|---|----------|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | |
| | | FRACTIONS | DECIMALS |
| | | ANGLES | |
| | | DO NOT SCALE THIS DRAWING | |
| | | MATERIAL | |
| | | SEE NOTES | |
| | | HEAT TREATMENT | |
| | | FINAL FINISH | |
| NEXT ASSY | USED ON | | |
| APPLICATION | | | |



| | | | |
|----------|---|--|-----------------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| | | LIST OF MATERIALS | |
| | MIT INSTRUMENTATION LAB CAMBRIDGE MASS DWG NO. 18 JUNE 63 CONTRACT NAS 9-497 | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| | DRAWN <i>Janaviale</i> CHECKED <i>W. J. Rhine</i> APPROVAL <i>W. J. Rhine</i> DATE 7-29-63 | SCREW, BUTTON HEAD SELF LOCKING, SOCKET HEX | |
| | NASA APPROVAL <i>W. J. Rhine</i> DATE 7-31-63 | SPECIFICATION CONTROL DRAWING | |
| | MIT APPROVAL <i>W. J. Rhine</i> DATE 7/21/63 | CODE IDENT NO. SIZE C | NASA DRAWING NO. 1010618 |
| | | SCALE NONE | WT SHC. / OF / |

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B 1010635

| REVISIONS | | | |
|-----------|--|----------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| - | INITIAL RELEASE CLASS A PER TDRR 02741 | 8/24/66 | WIK |
| A | REVISED PER TDRR 20241 | 8/24/66 | WIK |
| B | REVISED PER TDRR 23958 | 11/16/66 | WIK |

REQUIREMENTS:

I. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. MARKING:

- (1) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION: SUPPLIER'S NAME, NASA PART NUMBER AND REVISION LETTER, SUPPLIER'S LOT OR SERIAL NUMBER, DATE CODE, OR DATE OF MANUFACTURE.

2. INSPECTION AND ACCEPTANCE:

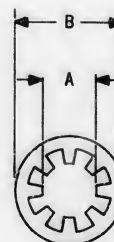
A. DIMENSIONS: AS SHOWN IN TABLE.

3. DESIGN

A. MATERIAL: CORROSION RESISTANT STEEL PER FED. STD. NO. 66, STEEL NO. 410.

B. FINISH: PASSIVATE PER MIL-F-14072, E300.

| NASA DASH NUMBER | DIMENSIONS | | |
|---------------------|------------|-------|------|
| | A | B | C |
| -001 | .375 | .500 | .022 |
| -002 | .500 | .625 | .025 |
| -003 | .569 | .685 | .017 |
| -004 | 1.262 | 1.437 | .015 |



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | | | |
|---|---|--|--------------|
| QTY REQ | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE MASS DWS NO. CONTRACT-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>Rollie Turner</i> DATE <i>28 JUN 63</i> CHECKED <i>W. J. Nelson</i> DATE <i>6 JUL 63</i> APPROVAL <i>W. J. Nelson</i> DATE <i>6 JUL 63</i> | | WASHER-LOCK (INTERNAL TOOTH) | |
| DO NOT SCALE THIS DRAWING MATERIAL SEE NOTES | | SPECIFICATION CONTROL DRAWING | |
| HEAT TREATMENT NONE | NASA APPROVAL <i>W. J. Nelson</i> DATE <i>21 JUL 63</i> | CODE IDENT NO. | SIZE |
| NEXT ASSY | MIT APPROVAL <i>W. J. Nelson</i> DATE <i>21 JUL 63</i> | C | 1010635 |
| USED ON | SCALE NONE | WT | SHEET 1 OF 1 |
| APPLICATION | FINAL FINISH NONE | | |

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REQUIREMENTS:

1. GENERAL:

- INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
- SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISION SPECIFIED IN ND 1015404, CLASS 3.

2. INSPECTION AND ACCEPTANCE:

- VISUAL INSPECTION: WORKMANSHIP.
- MECHANICAL REQUIREMENTS:

(1) MATERIAL:

- LEAD: IRON-NICKEL-COBALT ALLOY, PER ND 1015402.
- SKIRT: SAME AS LEAD.
- INSULATOR: CORNING 7052 OR EQUIVALENT.

(2) FINISH:

- LEAD: GOLD PLATED PER MIL-G-45204 (ELECTRO DEPOSITED .000050 MIN., .000150 MAX. OVER .000010 MAX. NICKEL STRIKE.
- SKIRT: SAME AS LEAD.
- INSULATOR: DOW CORNING NO. 1107 SILICONE COATING OR EQUIVALENT.

(3) DIMENSIONS: PER FIGURE.

(4) MARKING:

- PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED PER MIL-STD-129, WITH THE FOLLOWING INFORMATION.
 - SUPPLIER'S NAME.
 - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER.
 - SUPPLIER'S LOT OR SERIAL NUMBER.
 - DATE CODE, OR DATE OF MANUFACTURE.
- MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART OR PACKAGE.

3. DESIGN REQUIREMENTS:

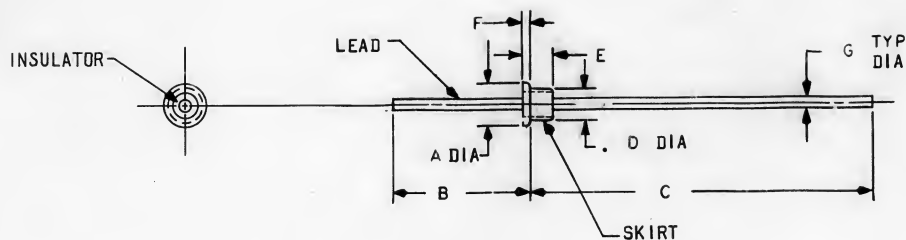
- LEAK RATE: MAX. OF 1×10^{-8} CC OF HELIUM/SEC. AT ONE ATMOSPHERE OF PRESSURE.
- CURRENT CAPACITY: 3.0 AMPS CONTINUOUS DUTY FOR 40°C RISE.
- RMS TEST VOLTS: 1000 VOLTS AT 90% HUMIDITY AT SEA LEVEL.

| PART NUMBER | A | B | C | D | E | F | G |
|-------------|------|------|------|------|------|------|------|
| 1010690-1 | .155 | .42 | 1.03 | .130 | .065 | .015 | .032 |
| | .145 | .36 | .97 | .120 | .055 | .005 | .028 |
| 1010690-2 | .139 | .202 | .315 | .117 | .080 | .022 | .042 |
| | .129 | .172 | .285 | .107 | .075 | .012 | .038 |

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | | |
|-----------|---------|---|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON |
| | | FRACTIONS DECIMALS ANGLES ± .005 ± |
| | | DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE REQUIREMENTS |
| | | HEAT TREATMENT |
| | | NONE |
| NEXT ASSY | USED ON | FINAL FINISH |
| | | NONE |
| | | APPLICATION |

| | | | |
|--|-------------------------|--|----------|
| QTY REQ | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS CONTRACT 5-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>P. Duff</i> DATE <i>23 OCT 63</i> | | TERMINAL, GLASS, FEED THRU | |
| CHECKED <i>C. Wilson</i> | | SPECIFICATION CONTROL DRAWING | |
| APPROVAL <i>S. White</i> 6 Nov 63 | | NASA DRAWING NO. | |
| APPROVAL | | NASA APPROVAL <i>W. J. Rhine</i> 11-6-63 | |
| MIT APPROVAL <i>J. H. Nelson</i> 11/6/63 | | CODE IDENT NO. | SIZE |
| | | C | 1010690 |
| | | SCALE NONE | WT |
| | | SHEET 1 OF 1 | |



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REQUIREMENTS:

1. GENERAL:

- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
- SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
- UNITS SHALL BE CAPABLE OF MEETING THE APPLICABLE QUALIFICATION REQUIREMENTS SPECIFIED IN MIL-C-26482
- PARTS SHALL BE PACKAGED WITH CONTAINERS PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, PART NUMBER, QUANTITY OF PARTS, DATE CODE, OR DATE OF MANUFACTURE, PLUS NASA DRAWING AND DASH NUMBER AND REVISION LETTER.

E PACKAGE PER ND1002215, CLASS I CODE 7

2. ACCEPTANCE AND INSPECTION

- DIMENSIONS: AS SHOWN.
- CONTACT ENGAGING AND SEPARATING FORCE 0.5 OUNCES MINIMUM USING PIN DIA OF 0.0283 / 0.0282 5 OUNCES MAX USING PIN DIA OF 0.0295 / 0.0294 INSERTION OF PINS SHALL BE TO A DEPTH OF 0.140 MIN
- CONCENTRICITY: PIN DIAMETER (DIA A) TO BE CONCENTRIC TO POSITIONING SHOULDER DIAMETER (DIA B) WITHIN .005 T.I.R.

3. DESIGN REQUIREMENTS.

- BODY: SEE TABLE
- (1) FINISH: (SEE TABLE 2)

- PIN: GOLD PLATED OVER COPPER FLASH PER MIL-C-26482, EXCEPT THICKNESS TO BE 100 MICROINCHES MIN.
- SOCKET: GOLD PLATED OVER COPPER FLASH PER MIL-C-26482, EXCEPT THICKNESS TO BE 100 MICROINCHES MIN.

- CONTACTS SHALL ACCEPT #22 TO #26 AWG STRANDED WIRE PER MIL-W-16878 EXCEPT INSULATION DIA. SHALL BE .034
- CURRENT RATING (MATED): 3 AMPERES .054

- CRIMP AND CONTACT RESISTANCE: 0.007 VOLTS DC MAXIMUM AT 3 AMPERES USE NO.22 AWG STRANDED WIRE MEASURED FROM REAR OF PIN CONTACT CRIMP BARREL TO REAR OF SOCKET CONTACT CRIMP BARREL DRY CIRCUIT CONTACT RESISTANCE 20 uV DC MAX AT 10 MA.

- CRIMP TENSILE STRENGTH: 8 POUNDS MINIMUM. USE NO.22 AWG STRANDED WIRE

NOTES:

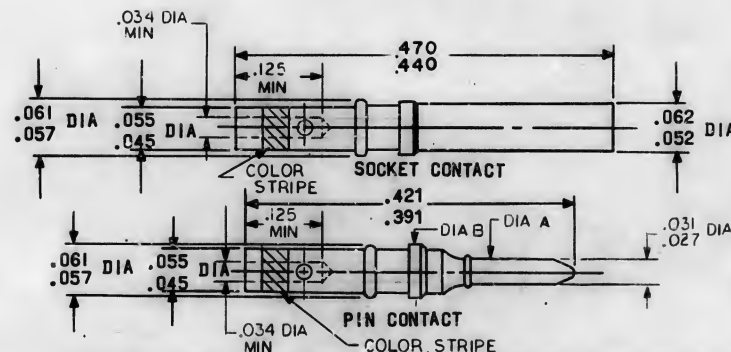
- SPECIAL TOOLING REQUIRED FOR CRIMPING, INSERTION AND WITHDRAWAL OF CONTACTS.
- THERMOCOUPLE GRADE COPPER CONTACTS PLATED WITH GOLD STRIKE
- THERMOCOUPLE GRADE CONSTANTAN CONTACTS ARE NOT PLATED
- THERMOCOUPLE CONTACTS TO MEET PERFORMANCE REQUIREMENTS OF ISA STANDARD, TYPE T.

| DASH NO | CONTACT TYPE | MATERIAL COMPOSITION | COLOR STRIPE |
|---------|--------------|--|--------------|
| -1 | PIN | LEAD COPPER PER MIL-C-26482 | NONE |
| -2 | SOCKET | | |
| -3 | PIN | THERMOCOUPLE GRADE COPPER SEE NOTE 3 | BROWN |
| -4 | SOCKET | | |
| -5 | PIN | THERMOCOUPLE GRADE CONSTANTAN SEE NOTE 3 | GREEN |
| -6 | SOCKET | | |

THE PART NO. IS THE DRAWING NO. PLUS THE APPLICABLE DASH NO.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | |
|---|-----------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | |
| FRACTIONS | DECIMALS ANGLES |
| ± | ± ± |
| DO NOT SCALE THIS DRAWING | |
| MATERIAL | |
| SEE REQUIREMENTS | |
| HEAT TREATMENT | |
| NONE | |
| FINAL FINISH | |
| NONE | |
| NEXT ASSY | USED ON |
| APPLICATION | |



| | | | |
|---|-------------------------|---|----------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE MASS Contract NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN BY <i>[Signature]</i> DATE <i>15 MAY 64</i> | | CONTACT, CRIMP TYPE NO.22 SIZE, PIN & SOCKET | |
| CHECKED BY <i>[Signature]</i> DATE <i>15 MAY 64</i> | | SPECIFICATION CONTROL DRAWING | |
| APPROVAL BY <i>[Signature]</i> DATE <i>15 MAY 64</i> | | CODE IDENT NO. SIZE 80230 C 1010770 | |
| NASA APPROVAL <i>[Signature]</i> DATE <i>10-C-64</i> | | SCALE NONE WT | |
| MIT APPROVAL <i>[Signature]</i> DATE <i>10-C-64</i> | | SHEET 1 OF 1 | |

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REQUIREMENTS:

1. GENERAL:

- A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
- C. UNITS SHALL BE CAPABLE OF MEETING ALL APPLICABLE QUALIFICATION REQUIREMENTS SPECIFIED IN MIL-C-26482
- D. UNITS SHALL BE CAPABLE OF MEETING ALL APPLICABLE ENVIRONMENTAL REQUIREMENTS OF MIL-C-26482.
- E. CRIMP TYPE CONTACTS (100% MIN, OF CONTACT CAVITIES) PER 1010770 AND APPLICABLE SEALING PLUG (15%, MIN, OF CONTACT CAVITIES) PER 1010958 TO BE SUPPLIED WITH EACH UNIT. SEE TABLE, SEE NOTE 5.
- F. PACKAGING: PRESERVATION, PACKAGING AND CONTAINER MARKING PER ND 1002215, CLASS 1, CODE 3.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

(1) MATERIAL:

- (a) SHELL: ALUMINUM ALLOY AS REQUIRED PER MIL-C-26482.
- (b) INSERT: SOLID DIELECTRIC PER MIL-C-26482 AND MIL-M-14 (TYPE MFH), OR EQUIVALENT FLUORO SILICONE RUBBER GROMMET. THIS MATERIAL SHALL BE NON-TOXIC OUTGASSING. SEE NOTE 5.
- (c) GASKETS: SILICONE RUBBER

(2) DIMENSIONS: PER DRAWING

(3)

- (4) FINISH: SHELL; CLEAR CONDUCTIVE ANODIZED. FINISH SHALL BE NON-OUTGASSING.

(5) MARKING:

- (a) PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
- (b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
SUPPLIER'S NAME
NASA PART NUMBER AND REVISION LETTER
DATE CODE, OR DATE OF MANUFACTURE
- (c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN REQUIREMENTS:

A. ELECTRICAL REQUIREMENTS

- (1) CONTACT CURRENT RATING: 3 AMPERES
- (2) VOLTAGE RATING: 250 VOLTS RMS OF 350 VDC
- (3) WITHSTANDING VOLTAGE: 375V RMS AT 70,000 FT. 1500 V RMS AT SEA LEVEL.
- (4) CONTACT RESISTANCE: 7 MILLIVOLTS MAX AT 3 AMP. REAR OF PIN CONTACT CRIMP BARREL TO REAR OF SOCKET CONTACT CRIMP BARREL. 50 MILLIVOLTS, MAX, AT 3 AMP WHEN MEASURED FROM REAR OF SOCKET CONTACT CRIMP BARREL TO OPPOSITE END OF HERMETIC CONNECTOR PIN CONTACT (SEE 1012151).
- (5) OPERATING TEMPERATURE: +125°C.
- (6) INSULATION RESISTANCE: 100,000 MEGOHMS, MIN, AT 25°C 500 VDC; 5000 MEGOHMS, MIN, AT 125°C, 500 VDC.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

1220101

| REVISIONS | | | |
|-----------|---|----------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| - | INITIAL RELEASE CLASS A PER TDRR 13946 | 11-0-6 | WJ |
| A | REVISED PER TDRR 16047 | 2/9/65 | WJ |
| B | REVISED PER TDRR 16697 | 2/9/65 | WJ |
| C | REVISED PER TDRR 18498 | 4/2/65 | WJ |
| D | REVISED PER TDRR 22760 | 10/16/65 | WJ |
| E | REVISED PER TDRR 28433 | 9/16/66 | WJ |

| DASH SOCKET TYPE FIG 11 | DASH SOCKET TYPE FIG 1 SEE NOTE 5 | DASH PIN TYPE FIG 1 | NO. OF CONTACTS | IN DEGREES | DIMENSIONS | | | MAX ENG FORCE (LBS) | MIN DISENG FORCE (LBS) |
|----------------------------------|---|------------------------------|-----------------------|---------------|------------|-------|------|------------------------------|---------------------------------|
| | | | | | A | B | C | | |
| -201 | -001 | -101 | 91 | 0 | | | | 40 | 4.75 |
| -202 | -002 | -102 | | 225 | 1.374 | 1.078 | | | |
| -203 | -003 | -103 | | 150 | 1.344 | 1.048 | | | |
| -204 | -004 | -104 | | 75 | | | | | |
| -205 | -005 -305 | -105 | 61 | 0 | | | | 35 | 3.75 |
| -206 | -006 -306 | -106 | | 225 | 1.202 | .952 | | | |
| -207 | -007 -307 | -107 | | 150 | 1.172 | .922 | | | |
| -208 | -008 -308 | -108 | | 75 | | | | | |
| | -009 | -109 | 37 | 0 | | | .843 | 25 | 2.80 |
| | -010 | -110 | | 225 | 1.078 | .828 | .781 | | |
| | -011 | -111 | | 150 | 1.048 | .797 | | | |
| | -012 | -112 | | 75 | | | | | |
| | -013 | -113 | 19 | 0 | | | | 20 | 1.50 |
| | -014 | -114 | | 225 | .921 | .703 | | | |
| | -015 | -115 | | 150 | .891 | .673 | | | |
| | -016 | -116 | | 75 | | | | | |
| | -017 | -117 | 7 | 0 | .719 | .578 | | 20 | 1.50 |
| | - | - | | - | | | | | |
| -019 | -119 | | | 150 | ±.015 | ±.015 | | | |
| - | - | - | | - | | | | | |

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

| | | | |
|---|-------------------------|--|------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>Louis</i> DATE <i>11-3-64</i> | | CONNECTOR, PLUG, ELECTRICAL | |
| CHECKED <i>W. Simpson</i> 11-3-64 | | | |
| APPROVAL <i>J. J. J.</i> 11/3/64 | | | |
| APPROVAL <i>J. J. J.</i> 11/3/64 | | SPECIFICATION CONTROL DRAWING | |
| NASA APPROVAL <i>W. J. J.</i> 11-4-65 | | CODE IDENT NO. SIZE | NASA DRAWING NO. |
| MIT APPROVAL <i>W. J. J.</i> 11-4-65 | | 80230 C | 1010771 |
| SCALE NONE | | WT | SHEET 1 OF 2 |

| | | |
|---|----------|-------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | |
| FRACTIONS | DECIMALS | ANGLES |
| ± | ± | ± |
| DO NOT SCALE THIS DRAWING | | |
| MATERIAL | | |
| SEE REQUIREMENTS | | |
| HEAT TREATMENT | | |
| NONE | | |
| FINAL FINISH | | |
| NONE | | |
| NEXT ASSY | USED ON | APPLICATION |

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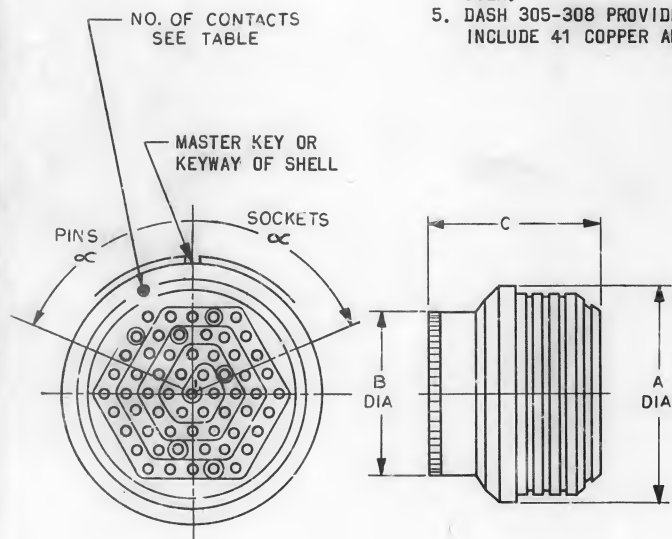
REQUIREMENTS: (CONTINUED)

B. MECHANICAL REQUIREMENTS:

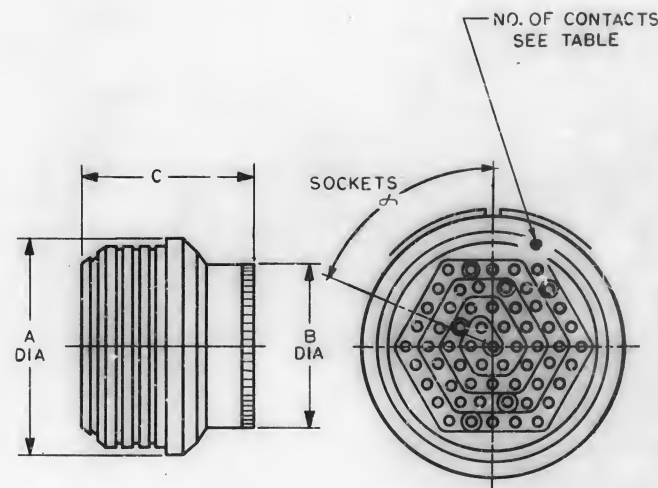
- (1) COUPLING MECHANISM: PUSH PULL QUICK DISCONNECT.
- (2) MAX ENGAGEMENT FORCE: MIN DISENGAGEMENT FORCE (WITH CONTACTS). PER TABLE
- (3) CONTACT RETENTION: 20 LBS. MIN IN DIRECTION OF MATING FORCE.
- (4) ALTITUDE IMMERSION: PER MIL-C-26500.

NOTES:

1. FOR MATING HALF SEE DRAWING 1012151 (HERMETIC) OR 1010844 (GRIMP), OR EQUIVALENT.
2. FOR STRAIN RELIEF CLAMP SEE DRAWING 1010774.
3. SPECIAL TOOLING REQUIRED FOR INSERTION AND REMOVAL OF CONTACTS.
4. ALTERNATE POSITIONS: THE INSERT, AS SHOWN, IS ROTATED DEGREES RELATIVE TO THE CL OF THE MASTER KEY AS INDICATED. THIS ALTERATION SHALL NOT BE ACCOMPLISHED BY USER.
5. DASH 305-308 PROVIDED WITH METHYLVINYL SILICONE RUBBER GROMMET; UNIT PACKAGE TO INCLUDE 41 COPPER AND 20 CONSTANTAN CONTACTS PER 1010770.



NORMAL SOCKET CONTACT VIEW-PIN OPPOSITE
(FOR REF ONLY)
(GROMMET VIEW REAR)
FIG. I



REVERSE SOCKET CONTACT VIEW
(FOR REF ONLY)
(GROMMET VIEW REAR)
FIG. II

| | | | | | | | |
|---|--|-------------------------|--|--|--|------------------|--|
| QTY REQD | | PART OR IDENTIFYING NO. | | NOMENCLATURE OR DESCRIPTION | | FIND NO. | |
| LIST OF MATERIALS | | | | | | | |
| M I T INSTRUMENTATION LAB CAMBRIDGE MASS DWS NO. Contract NAS 9-497 DRAWN <i>Bender</i> DATE <i>31 AUG 64</i> CHECKED <i>Ed Foster</i> 2 SEP 64 APPROVAL <i>g J Kenna</i> 11/2/64 APPROVAL | | | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS CONNECTOR PLUG, ELECTRICAL SPECIFICATION CONTROL DRAWING NASA APPROVAL <i>W. J. R. L.</i> 11-4-64 MIT APPROVAL <i>W. J. R. L.</i> 11-4-64 | | | |
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± | | HEAT TREATMENT | | CODE IDENT NO. SIZE | | NASA DRAWING NO. | |
| DO NOT SCALE THIS DRAWING MATERIAL | | FINAL FINISH | | 80230 C | | 1010771 | |
| NEXT ASSY USED ON | | APPLICATION | | SCALE | | WT | |
| | | | | | | SHEET 2 OF 2 | |

| REVISIONS | | | |
|-----------|--|----------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| - | INITIAL RELEASE CLASS A PER TDRR 13946 | 11-11-64 | WJL |
| A | REVISED PER TDRR 16047 | 8/1/65 | WJL |
| B | REVISED PER TDRR 16697 | 8/1/65 | WJL |
| C | REVISED PER TDRR 18498 | 4/1/65 | WJL |
| D | REVISED PER TDRR 22760 | 10/1/65 | WJL |
| E | REVISED PER TDRR 28433 | 6 MAY 66 | WJL |

1010771 E

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REQUIREMENTS

1. GENERAL:

- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 3.
- EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH THE MANUFACTURER'S NAME AND SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS AND DATE OF MANUFACTURE.
- PACKAGING SHALL BE IN ACCORDANCE WITH ND 1002215 CLASS 1.

2. ACCEPTANCE AND INSPECTION:

- CONDUCTOR, SOLID: NO. 24 AND 26 AWG - COPPER PER QQ-W-343; NO. 28 AWG - CADMIUM CHROME COPPER ALLOY (98% COPPER MINIMUM); SILVER PLATED 40 MICRO-INCHES MINIMUM TO 80 MICRO-INCHES MAXIMUM PER ASTM-B-298-58T.

B. WORKMANSHIP:

- THE SURFACE OF THE FINISHED WIRE SHALL BE CLEAN, SMOOTH, FREE FROM FOREIGN RESIDUE AND FREE FROM VISIBLE BLEMISHES. THERE SHALL BE NO IMPERFECTIONS WHICH INCREASE THE OVERALL DIAMETER SO AS TO EXCEED THE MAXIMUM SPECIFIED. THE INSULATION SHALL BE UNIFORM THROUGHOUT AND FREE FROM ANY DEFECTS SUCH AS INCLUSIONS, RADIAL CRACKS, PINHOLES, DISCOLORATION OF CONDUCTOR OR INSULATION WHICH MAY AFFECT ITS SERVICEABILITY OR REQUIRE SPECIAL HANDLING.
- SPLICES: THE WIRE SHALL BE STRIPPED 4 ± 2 INCHES ON EITHER SIDE OF ANY SPLICE

3. DESIGN REQUIREMENTS:

- VOLTAGE RATING: SHIELDED: 300V RMS (CONDUCTOR TO SHIELD) UNSHIELDED: 600 V RMS
- TEMPERATURE: $+105^{\circ}\text{C}$ MAXIMUM CONTINUOUS
- INSULATION: POLYETHYLENETEREPHALATE (BIAXIALY ORIENTED) FILM, THERMOPLASTIC LAMINATE. THE POLYETHYLENETEREPHALATE SHALL BE ADJACENT TO THE CONDUCTOR.
- SERVED SHIELD: 90% MINIMUM COVERAGE
 - MATERIAL: #28 AWG COPPER WIRE, SILVER PLATED, PER MIL-W-16878 (BARE CONDUCTOR) FLATTENED AND WRAPPED AROUND PRIMARY INSULATION.
 - DRAIN WIRE, WHEN SPECIFIED: #28 AWG; MATERIAL SAME AS PARA. 2.A.
- FLAMMABILITY: 30 SECONDS MAXIMUM BURNING TIME FOR 3 INCHES MAXIMUM FLAME TRAVEL WHEN TESTED PER MIL-W-16878.
- INSULATION CUT THROUGH: SPECIMENS OF THE WIRE SHALL RESIST THE PENETRATION OF THE UNDERWRITERS LABORATORY STANDARD PENETRATION APPARATUS USING A METAL BLADE WITH A 90° ANGLE AND .003-INCH ($\pm .0002$) RADIUS EDGE OF THE POINT OF CONTACT. THE BLADE SHALL BE LOADED WITH 750 GRAMS AND SHALL BE APPLIED TO THE INSULATED WIRE FOR A PERIOD OF 24 HOURS WHILE MAINTAINED AT $+50^{\circ}\text{C}$ DURING THIS PERIOD, A POTENTIAL OF 500 VOLTS RMS SHALL BE APPLIED BETWEEN THE BLADE AND THE METAL CONDUCTOR OF THE SPECIMEN AND NO ELECTRICAL CONTINUITY SHALL OCCUR.
- CAPACITANCE (FOR 1010807-1): TEST PER MIL-C-17
 - CONDUCTOR TO CONDUCTOR: 10 PICO FARADS PER FOOT, MAXIMUM
 - CONDUCTOR TO SHIELD: 20 PICO FARADS PER FOOT, MAXIMUM
- DIELECTRIC CONSTANT: 4.0 MAX AT 60 CPS AND $+77^{\circ}\text{F}$. WHEN TESTED PER FED-STD-406 METHOD 4021
- RESISTANCE, DC: PER TABLE, WHEN TESTED PER METHOD 303 OF MIL-STD-202.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND1002034 FOR THIS DRAWING.

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES \pm \pm \pm DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

1080101

REVISIONS

| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
|-----|------|---|-----|-----|-----------|----------|
| - | | INITIAL RELEASE CLASS A PER TDRR 13385 | | | 10-10-69 | DJP |
| A | | REVISED PER TDRR 15186 | | | 1-7-65 | WR |
| B | | REVISED PER TDRR 16991 | | | 11/16/65 | WR |
| C | | REVISED PER TDRR 17607 | | | 6/24/65 | WR |
| D | | REVISED PER TDRR 19137 | | | 5/16/65 | WR |
| E | | REVISED PER TDRR 20110 | LK | | 22 JUN 65 | WR |
| F | | REVISED PER TDRR 20621 | FD | | 8/3/65 | WR |
| G | | REVISED PER TDRR 21595 | ZUP | | 8/31/65 | WR |
| H | | REVISED PER TDRR 24503 | ZUP | | 12/19/65 | WR |
| J | | REVISED PER TDRR 28437 | | | 5-17-66 | WR |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|--|----------------------------|--|--------------------------------|------------------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>K.F. Hild</i> 10-10-69 | | WIRE POLYETHYLENETEREPHALATE INSULATION | | |
| CHECKED <i>A. Marts</i> 10-7-69 | | SOLID, COPPER ALLOY, SILVER PLATE | | |
| APPROVED <i>J. B. Test</i> 10-11-69 | | SPECIFICATION CONTROL DRAWING | | |
| APPROVED <i>J. H. Hild</i> 10/14/69 | | CODE IDENT NO. 80230 | SIZE C | DRAWING NO. 1010807 |
| APPROVED <i>W. J. Hild</i> 10/14/69 | | DATE | SCALE NONE | SHEET 1 OF 4 |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMERLY PROVIDED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL, ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREIN.

- K. INSULATION RESISTANCE: 2,500 MEGOHMS/1000 FEET MINIMUM WHEN TESTED PER MIL-W-16878, IMMERSED IN WATER.
- L. TENSILE STRENGTH: 55,000 PSI MINIMUM TO 75,000 PSI MAXIMUM WHEN TESTED PER FEDERAL STANDARD 151 METHOD 211 FOR NO 28 AWG AND 30,000 PSI MIN TO 45,000 PSI MAXIMUM FOR NO. 24 AWG AND 30,000 PSI MIN TO 45,000 PSI MAXIMUM FOR NO. 26 AWG.
- M. COLD BEND: INSULATION SHALL WITHSTAND VOLTAGE PER TABLE AFTER 4 HOURS AT -65°C. AND BENT AROUND A 1/2 INCH MANDREL.
- N. HEAT RESISTANCE: INSULATION SHALL WITHSTAND BREAKDOWN VOLTAGES PER TABLE AFTER 96 HOURS AT +130°C.
- P. ELONGATION: 8 PERCENT MINIMUM WHEN TESTED PER FEDERAL STANDARD 151 METHOD 211
- R. CONCENTRICITY, CONDUCTOR: THE MINIMUM THICKNESS OF THE INSULATION SHALL NOT BE LESS THAN 41 PER CENT OF THE DIFFERENCE BETWEEN THE MEASURED DIAMETER OVER THE INSULATION AND THE MEASURED DIAMETER OVER THE CONDUCTOR OR NOT LESS THAN 80 PER CENT OF THE MAXIMUM THICKNESS AT THAT CROSS SECTION.
- S. INSULATION PULL OFF FORCE: 8 OUNCES MINIMUM
- (1) A SIX (6) INCH LENGTH OF WIRE SHALL BE STRIPPED 1-1/2 INCHES ON EACH END. ONE END OF THE WIRE SHALL BE PASSED THROUGH A HOLE IN A METAL PLATE WHOSE DIAMETER IS 0.015 FOR 28 AWG .018 FOR 26 AWG AND 0.022 FOR 24 AWG. THE END OF THE WIRE WHICH PASSES THROUGH THE PLATE SHALL THEN BE PULLED IN SUCH MANNER AS TO MEASURE THE FORCE REQUIRED TO PULL THE WIRE THROUGH THE INSULATION.
- T. MINIMUM CONTINUOUS LENGTH: 100 FEET MIN FOR SINGLE CONDUCTORS & 50 FEET MIN FOR PAIRS AND TRIADS
- U. SPLICES OF THE CONDUCTOR SHALL BE ELECTROWELDED BEFORE FINAL DRAWING AND SHALL BE OF THE BUTT TYPE. 2" ON EITHER SIDE OF SPLICE SHALL BE STRIPPED OF INSULATION.
- V. DIELECTRIC STRENGTH: THE DIELECTRIC STRENGTH SHALL BE AS SPECIFIED IN THE TABLE ON SHEET 3, AND SHALL BE TESTED PER MIL-W-16878. (IMMERSED IN WATER CONTAINING A WETTING AGENT)
4. APPLICATION: WIRE MAY BE USED ONLY WHEN ENCAPSULATED

2080101

| REVISIONS | | | |
|-----------|--|----------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| - | INITIAL RELEASE CLASS A PER TDRR 13385 | 10-14-64 | WH |
| A | REVISED PER TDRR 15186 | 11-7-64 | WH |
| B | REVISED PER TDRR 16991 | 11-11-64 | WH |
| C | REVISED PER TDRR 17607 | 11-11-64 | WH |
| D | REVISED PER TDRR 19137 | 11-11-64 | WH |
| E | REVISED PER TDRR 20110 | 12-20-64 | WH |
| F | REVISED PER TDRR 20621 | 1-13-65 | WH |
| G | REVISED PER TDRR 21595 | 1-13-65 | WH |
| H | REVISED PER TDRR 24503 | 1-14-65 | WH |
| J | REVISED PER TDRR 28437 | 5-12-66 | WH |

| | | |
|-------------|---------|---|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON |
| | | FRACTIONS DECIMALS ANGLES |
| | | ± — ± ± — |
| | | DO NOT SCALE THIS DRAWING |
| | | MATERIAL _____ |
| | | HEAT TREATMENT _____ |
| NEXT ASSY | USED ON | FINAL FINISH _____ |
| APPLICATION | | |

| | | | |
|---|-----------------------------|---|---------------------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. DWG. NO. CONTRACT | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>J.F. White</i> DATE <i>5-20-64</i> | | WIRE POLYETHYLENETEREPTHALATE INSULATION | |
| CHECKED <i>A. M. ...</i> 10-7-64 | | SOLID, COPPER ALLOY, SILVER PLATE | |
| APPROVAL <i>D. B. ...</i> 10-14-64 | | SPECIFICATION CONTROL DRAWING | |
| NASA APPROVAL <i>W.D. ...</i> 10-14-64 | CODE IDENT NO. <i>80230</i> | SIZE <i>C</i> | NASA DRAWING NO. <i>1010807</i> |
| MIT APPROVAL <i>2/26/64</i> | SCALE <i>NONE</i> | WT | SHEET 2 OF 4 |

4

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY OMISSION, MISSTATEMENT, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSEING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREIN.

3

2

1

1080101

| REVISIONS | | | |
|-----------|--|----------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| - | INITIAL RELEASE CLASS A PER TDRR 13385 | 10-10-64 | W.L. |
| A | REVISED PER TDRR 15186 | 10-2-65 | W.L. |
| B | REVISED PER TDRR 16991 | 10-2-65 | W.L. |
| C | REVISED PER TDRR 17607 | 10-2-65 | W.L. |
| D | REVISED PER TDRR 19137 | 10-2-65 | W.L. |
| E | REVISED PER TDRR 20110 | 10-2-65 | W.L. |
| F | REVISED PER TDRR 20621 | 10-2-65 | W.L. |
| G | REVISED PER TDRR 21595 | 10-2-65 | W.L. |
| H | REVISED PER TDRR 24503 | 10-2-65 | W.L. |
| J | REVISED PER TDRR 28437 | 5-7-67 | W.L. |

| DASH NO. | AWG SIZE PER COND. | UNINSULATED CONDUCTOR DIAMETER INCHES | WALL THICKNESS PER COND. NOMINAL | DIAMETER OVER CONDUCTOR INSULATION | NUMBER OF COND. TURNS PER INCH | CONDUCTOR COLOR INSULATION | DIAMETER OVER SHIELD (MAX) | DIAMETER JACKET OVER SHIELD (MAX) | WALL THICKNESS | COLOR JACKET | DC RES MAX PER COND OHMS/M FT. | DIELECTRIC STRENGTH VOLTS RMS | COLD BEND & HEAT RESISTANCE VOLTS RMS MIN |
|----------|--------------------|---------------------------------------|----------------------------------|------------------------------------|--------------------------------|-------------------------------|----------------------------|-----------------------------------|----------------|--------------|--------------------------------|-------------------------------|---|
| -1 | 28 | .0126 +.0003 -.0001 | .0055 | .023 ± .002 | 3 5 ± .2 | BLUE WHITE RED | .079 | .095 | .007 ± .0015 | WHITE | 75 | 1500 | 1500 |
| -2 | 28 | .0126 +.0003 -.0001 | .0055 | .023 ± .002 | 2 .5 ± .2 | RED WHITE | .053 | .070 | .007 ± .0015 | WHITE | 75 | 1500 | 1500 |
| -3 | 24 | .0201 +.0006 -.0002 | .0055 | .0305 ± .002 | 2 5 ± .2 | RED WHITE | .069 | .086 | .007 ± .0015 | WHITE | 26 | 1500 | 1500 |
| -4 | 28 | .0126 +.0003 -.0001 | .007 | .0265 ± .002 | 1 | WHITE | — | — | — | — | 75 | 2500 | 2000 |
| -5 | 24 | .0201 +.0006 -.0002 | .007 | .034 ± .002 | 1 | WHITE | — | — | — | — | 26 | 2500 | 2000 |
| -6 | 28 | .0126 +.0003 -.0001 | .007 | .0265 ± .002 | 2 .5 ± .2 | WHITE RED | — | — | — | — | 75 | 2500 | 2000 |
| -7 | 24 | .0201 +.0006 -.0002 | .007 | .034 ± .002 | 2 5 ± .2 | WHITE RED | — | — | — | — | 26 | 2500 | 2000 |
| -8 | 28 | .0126 +.0003 -.0001 | .007 | .0265 ± .002 | 3 .5 ± .2 | WHITE RED BLUE | — | — | — | — | 75 | 2500 | 2000 |
| -9 | 24 | .0201 +.0006 -.0002 | .007 | .034 ± .002 | 3 .5 ± .2 | WHITE RED BLUE | — | — | — | — | 26 | 2500 | 2000 |
| -10 | 28 | .0126 +.0003 -.0001 | .007 | .0265 ± .002 | 4 .8 ± .2 | WHITE RED BLUE GREEN | — | — | — | — | 75 | 2500 | 2000 |
| -11 | 24 | .0201 +.0006 -.0002 | .007 | .034 ± .002 | 4 .8 ± .2 | WHITE RED BLUE GREEN | — | — | — | — | 26 | 2500 | 2000 |
| -12 | 24 | .0201 +.0006 -.0002 | .0055 | .0305 ± .002 | 1 | WHITE | .040 | .057 | .007 ± .0015 | WHITE | 26 | 1500 | 1500 |
| -13 | 24 | .0201 +.0006 -.0002 | .0055 | .0305 ± .002 | 3 .5 ± .2 | WHITE RED BLUE | .092 | .109 | .007 ± .0015 | WHITE | 26 | 1500 | 1500 |

| | | | |
|---|---|--|----------------------------|
| QTY REQ | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>W. R. H. H.</i> DATE <i>10-14-64</i> | | WIRE POLYETHYLENETEREPHTHALATE INSULATION | |
| CHECKED <i>G. M. H. H.</i> DATE <i>10-7-64</i> | | SOLID, COPPER ALLOY, SILVER PLATE | |
| APPROVAL <i>W. R. H. H.</i> DATE <i>10-14-64</i> | | SPECIFICATION CONTROL DRAWING | |
| NASA APPROVAL <i>W. R. H. H.</i> DATE <i>10-12-64</i> | CODE IDENT NO. <i>80230</i> SIZE <i>C</i> | NASA DRAWING NO. <i>1010807</i> | |
| MIT APPROVAL <i>W. R. H. H.</i> DATE <i>10-14-64</i> | SCALE <i>NONE</i> | WT | SHEET <i>3</i> OF <i>4</i> |

| | | |
|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | |
| FRACTIONS | DECIMALS | ANGLES |
| ± | ± | ± |
| DO NOT SCALE THIS DRAWING | | |
| MATERIAL | | |
| HEAT TREATMENT | | |
| NEXT ASSY | USED ON | FINAL FINISH |
| APPLICATION | | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE, OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY VALUATION, WHETHER EVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED AS IMPLICATION OR OTHERWISE IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVERTING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREIN.

| REVISIONS | | | | | | |
|-----------|------|-------------------------------|-----|-----|-----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| E | | THIS SHT ADDED PER TDRR 20110 | LK | | 22 JUN 65 | WHL |
| F | | REVISED PER TDRR 20621 | WHL | | 8/3/65 | WHL |
| G | | REVISED PER TDRR 21595 | WHL | | 8/31/65 | WHL |
| H | | REVISED PER TDRR 24503 | WHL | | 12/14/65 | WHL |
| J | | REVISED PER TDRR 28437 | | | 5-17-66 | WHL |

| NASA DASH NO. | AWG SIZE PER COND | UNINSULATED CONDUCTOR DIAMETER INCHES | WALL THICKNESS PER COND. NOMINAL | DIAMETER OVER CONDUCTOR INSULATION | NUMBER OF CONDUCTORS TURNS PER INCH | CONDUCTOR COLOR INSULATION | DIAMETER OVER SHIELD (MAX) | DIAMETER JACKET OVER SHIELD MAX | WALL THICKNESS | COLOR JACKET | DC RES MAX PER COND. OHMS/M FT. | DIELECTRIC STRENGTH VOLTS RMS | COLD BEND & HEAT RESISTANCE VOLTS RMS MIN | DRAIN WIRE |
|---------------|-------------------|---------------------------------------|----------------------------------|------------------------------------|-------------------------------------|----------------------------|----------------------------|---------------------------------|----------------|--------------|---------------------------------|-------------------------------|---|------------|
| -29 | 26 | .0159 +.0005 -.0002 | .007 | .0295 ±.002 | 3 .5 ±.2 | RED WHITE BLUE | — | — | — | — | 42 | 2500 | 2000 | NO |
| -28 | 26 | .0159 +.0005 -.0002 | .0055 | .0269 ±.002 | 2 .5 ±.2 | RED WHITE | .061 | .078 | .007 ±.0015 | WHITE | 42 | 1500 | 1500 | YES |
| -27 | 26 | .0159 +.0005 -.0002 | .007 | .0295 ±.002 | 2 .5 ±.2 | RED WHITE | — | — | — | — | 42 | 2500 | 2000 | NO |
| -14 | 28 | .0126 +.0003 -.0001 | .0055 | .023 ±.002 | 3 .5 ±.2 | BLUE WHITE RED | .079 | .095 | .007 ±.0015 | WHITE | 75 | 1500 | 1500 | YES |
| -15 | 28 | .0126 +.0003 -.0001 | .0055 | .023 ±.002 | 2 .5 ±.2 | RED WHITE | .053 | .070 | .007 ±.0015 | WHITE | 75 | 1500 | 1500 | YES |
| -16 | 24 | .0201 +.0006 -.0002 | .0055 | .0305 ±.002 | 2 .5 ±.2 | RED WHITE | .069 | .086 | .007 ±.0015 | WHITE | 26 | 1500 | 1500 | YES |
| -17 | 24 | .0201 +.0006 -.0002 | .0055 | .0305 ±.002 | 1 | WHITE | .040 | .078 | .007 ±.0015 | WHITE | 26 | 1500 | 1500 | YES |
| -18 | 24 | .0201 +.0006 -.0002 | .0055 | .0305 ±.002 | 3 .5 ±.2 | WHITE BLUE | .092 | .109 | .007 ±.0015 | WHITE | 26 | 1500 | 1500 | YES |
| -19 | 24 | .0201 +.0006 -.0002 | .007 | .034 ±.002 | 1 | RED | — | — | — | — | 26 | 2500 | 2000 | NO |
| -20 | 24 | .0201 +.0006 -.0002 | .007 | .034 ±.002 | 1 | BLUE | — | — | — | — | 26 | 2500 | 2000 | NO |
| -21 | 24 | .0201 +.0006 -.0002 | .007 | .034 ±.002 | 1 | YELLOW | — | — | — | — | 26 | 2500 | 2000 | NO |
| -22 | 26 | .0159 +.0005 -.0002 | .007 | .0295 ±.002 | 1 | WHITE | — | — | — | — | 42 | 2500 | 2000 | NO |
| -23 | 28 | .0126 +.0003 -.0001 | .0055 | .023 ±.002 | 1 | WHITE | .033 | .063 | .007 ±.0015 | WHITE | 75 | 1500 | 1500 | YES |
| -24 | 26 | .0159 +.0005 -.0002 | .007 | .0295 ±.002 | 1 | YELLOW | — | — | — | — | 42 | 2500 | 2000 | NO |
| -25 | 26 | .0159 +.0005 -.0002 | .007 | .0295 ±.002 | 1 | RED | — | — | — | — | 42 | 2500 | 2000 | NO |
| -26 | 26 | .0159 +.0005 -.0002 | .007 | .0295 ±.002 | 1 | BLUE | — | — | — | — | 42 | 2500 | 2000 | NO |

THIS SHEET ADDED

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|---|-------------------------|--|-----------------------------|-------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN R. KINGSBURY | 6-24-65 | WIRE POLYETHYLENETEREPTHALATE INSULATION | | |
| CHECKED G. M. M. M. | 6-25-65 | SOLID, COPPER ALLOY, SILVER PLATE | | |
| APPROVED G. M. M. M. | 6-25-65 | SPECIFICATION CONTROL DRAWING | | |
| APPROVED MIT | W. J. R. R. | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC | W. J. R. R. | 80230 | C | 1010807 |
| DATE | | SCALE NONE | SHEET 4 OF 4 | |

| | |
|--|---------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± — DO NOT SCALE THIS DRAWING | |
| MATERIAL | |
| NEXT ASSY | USED ON |
| APPLICATION | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT INCURS NO LIABILITY, NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFERRING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREOF.

REQUIREMENTS:

1. GENERAL:

- INTERPRET DRAWING IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED BY MIL-D-70327.
- SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
- EACH SHIPPING AND UNIT CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, LOT NUMBER AND DATE OF MANUFACTURE.

2. ACCEPTANCE AND INSPECTION:

- THE WIRE CONDUCTOR SHALL MEET THE REQUIREMENTS OF PS 1015400 EXCEPT FOR SIZE.
- INSULATION: THE WIRE SHALL BE COVERED WITH A UNIFORM WALL OF POLY-VINYLIDENE FLUORIDE. COLOR, WHITE CONFORMING TO THE LIMITS OF MIL-STD-104.
- WORKMANSHIP: THE WIRE SHALL BE CONSTRUCTED AND FINISHED IN A THOROUGHLY WORKMANLIKE MANNER. THE WIRE SHALL BE FREE FROM LUMPS, KINKS AND ABRADED SURFACES AND THE INSULATION SHALL BE READILY REMOVED BY STANDARD COMMERCIAL STRIPPING METHODS.

3. DESIGN: TEST PER MIL-W-16878 UNLESS OTHERWISE SPECIFIED

- TEMPERATURE RATING: -40 TO +125°C
- VOLTAGE RATING: 600 RMS AT +25°C, 300 VRMS AT +125°C
- DIELECTRIC STRENGTH: 2200 VOLTS DC MIN AFTER 2 HOURS IMMERSION IN WATER AT 25 ± 5°C. TEST PER METHOD 301 OF MIL-STD-202 AND FED SPEC J-C-98
- HEAT RESISTANCE: AFTER CONDITIONING FOR 96 HOURS AT 150°C, MUST PASS 2.0 KV DC MIN DIELECTRIC STRENGTH, SHRINK OF INSULATION SHALL BE 1/8 INCH MAX.
- INSULATION RESISTANCE (AFTER CONDITIONING FOR 2 HOURS AT 25 ± 5°C), 200 MEG OHMS PER 1,000 FT. MIN. TEST PER METHOD 302 OF MIL-STD-202 AT 500 VDC & FED SPEC J-C-98
- COLD BEND: AFTER CONDITIONING FOR 4 HOURS AT -54°C, WIRE SHALL MEET THE REQUIREMENTS OF MIL-W-16878/1 WHEN USING MANDRELS SPECIFIED IN TABLE 1.
- THE WIRE SHALL BE DELIVERED WOUND ON SPOOLS OR REELS 12 INCHES MAX IN DIAMETER IN MIN LENGTHS OF 100 FT PER SPOOL. BOTH ENDS OF THE CABLE SHALL BE ACCESSIBLE FOR ELECTRICAL CONNECTIONS. CONDUCTORS SHALL NOT HAVE SPLICES OR BUTT WELDS UNDER THE INSULATION.
- RESISTANCE, DC: MEASUREMENT PER METHOD 6021 OF SPECIFICATION FED SPEC J-C-98
- SOLDERING: 1/8 MAXIMUM SHRINKAGE.
- FLAMMABILITY: 15 SECONDS MAX BURNING TIME, 1 INCH MAX FLAME TRAVEL.
- DIELECTRIC CONSTANT: 9.0 MAX.
- CUT THRU: 1500 GRAMS-60 MINUTES.

SPECIMENS OF FINISHED WIRE SHALL BE SUBJECTED TO PENETRATION OF A .003" ± .0002" RADIUS STEEL CUTTING EDGE DESIGNED TO SIMULATE THE CONFIGURATION OF THE EDGE OF A CONNECTOR PIN WITH 1500 GRAMS APPLIED AT THE POINT OF CONTACT AT A TEMPERATURE OF 25-30°C. CONTACT OF THE CUTTING EDGE THROUGH THE INSULATION AND JACKET (WHERE APPLICABLE) TO THE CONDUCTOR SHALL BE INDICATED BY A SUITABLE SENSING DEVICE.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

| | | |
|--|---------|-------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES | | |
| DO NOT SCALE THIS DRAWING MATERIAL SEE REQUIREMENTS | | |
| HEAT TREATMENT NONE | | |
| FINAL FINISH NONE | | |
| NEXT ASSY: | USED ON | APPLICATION |

| | | | |
|---|-------------------------|---|----------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | F NO NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE MASS DWG NO. <i>1010848</i> DATE <i>6 NOV 64</i> CHECKED <i>Ed Foster</i> APPROVAL <i>12-15-64</i> | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS WIRE, ELECTRICAL-NICKEL, VINYLIDENE FLUORIDE INSULATED SPECIFICATION CONTROL DRAWING CODE IDENT NO. SIZE C NOMENCLATURE OR DESCRIPTION 1010848 SCALE NONE WT SHEET 1 OF 1 | |

TABLE 1

| NASA DASH NUMBER | AWG SIZE | COND. DIA | | | DIA OVER INSULATION | | RES OHM/FT ±10% MAX | COLD TEST MANDREL DIA MAX |
|------------------|----------|-----------|-------|-------|---------------------|------|------------------------|---------------------------|
| | | MIN | NOM | MAX | MIN | MAX | | |
| -1 | 26 | .0157 | .0159 | .0161 | .034 | .038 | 0.2373 | 1 |
| -2 | 24 | .0199 | .0201 | .0203 | .038 | .042 | 0.1485 | 2 |
| -3 | 22 | .0250 | .0253 | .0256 | .043 | .047 | 0.0937 | 2 |
| -4 | 20 | .0317 | .0320 | .0323 | .051 | .055 | 0.0586 | 2 |
| -5 | 18 | .0399 | .0403 | .0407 | .058 | .062 | 0.0375 | 2 |
| -6 | 16 | .0503 | .0508 | .0513 | .069 | .073 | 0.0231 | 2 |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A "DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION," THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY INEQUITY, NEGLIGENCE, OR THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE BASIS FOR THE SPECIFICATION OR DRAWING. THIS NOTICE IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFIRMING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREIN.

REQUIREMENTS:

1. GENERAL:

- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
- UNITS SHALL BE CAPABLE OF MEETING ALL APPLICABLE QUALIFICATION REQUIREMENTS SPECIFIED IN MIL-C-26482.
- UNITS SHALL BE CAPABLE OF MEETING ALL APPLICABLE ENVIRONMENTAL REQUIREMENTS OF MIL-C-26482.
- CRIMP TYPE CONTACTS (100%, MIN, OF CONTACT CAVITIES) PER 1010770 AND APPLICABLE SEALING PLUGS (15%, MIN, OF CONTACT CAVITIES) PER 1010958 TO BE SUPPLIED WITH EACH UNIT.
- PRESERVATION PACKAGING, PACKING AND CONTAINER MARKING PER ND 1002215, CLASS 1, CODE 3.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

(1) MATERIAL:

- SHELL: ALUMINUM ALLOY AS REQUIRED PER MIL-C-26482.
- INSERT: SOLID DIELECTRIC PER MIL-C-26482 AND MIL-M-14 (TYPE MFH), OR EQUIVALENT. METHYL-VINYL SILICONE RUBBER GROMMET. THIS MATERIAL SHALL BE NON-TOXIC OUTGASSING.
- GASKETS: METHYL-VINYL SILICONE RUBBER

- FINISH: SHELL; CLEAR CONDUCTIVE ANODIZED, FINISH SHALL BE NON-OUTGASSING.

(2) MARKING:

- PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND REVISION LETTER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
- PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:
SUPPLIER'S NAME
NASA PART NUMBER AND REVISION LETTER
DATE CODE, OR DATE OF MANUFACTURE
- MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

3. DESIGN:

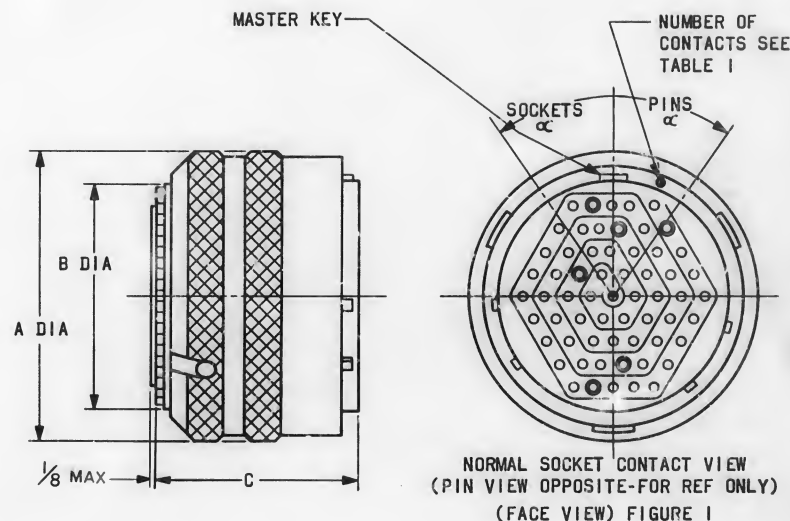
A. ELECTRICAL REQUIREMENTS:

- CONTACT CURRENT RATING: 3 AMPERES
- VOLTAGE RATING: 250 VOLTS RMS OR 350 VDC
- WITHSTANDING VOLTAGE: 375 V RMS AT 70,000 FT. 1500 V RMS AT SEA LEVEL.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

1010929 B

| REVISIONS | | | |
|-----------|----------------------------------|---------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| — | INITIAL RELEASE CLASS A PER TDRR | 5-4-65 | WLF |
| A | REVISED PER TDRR 22769 | | WLF |
| B | REVISED PER TDRR 28447 | 5-10-65 | WLF |



| | | | |
|--|------------------------|--|---------------|
| QTY REQD | PART OR IDENTIFYING NO | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS Contract NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>Bender</i> 23 MAR 65 CHECKED <i>Ed Felt</i> 25 MAR 65 APPROVAL <i>J. H. Spiller</i> | | CONNECTOR, PLUG, ELECTRICAL- BAYONET LOCKING COUPLING | |
| SEE REQUIREMENTS | | SPECIFICATION CONTROL DRAWING | |
| HEAT TREATMENT NONE | | CODE IDENT NO 80230 | SIZE C |
| FINAL FINISH SEE REQUIREMENTS | | NASA DRAWING NO. 1010929 | SCALE NONE |
| MIT APPROVAL <i>WLF</i> 4 May 65 | | WT | SHEET 1 OF 2 |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT HAS FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS AN IMPLICIT LICENSE TO THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING THE RIGHT OF PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY BE OR MAY BE RELATED THEREIN.

REQUIREMENTS: (CONTINUED)

- (4) CONTACT RESISTANCE: 7 MILLIVOLTS, AT 3 AMP. REAR OF PIN CONTACT CRIMP BARREL TO REAR OF SOCKET CONTACT CRIMP BARREL. 50 MILLIVOLTS, MAX, AT 3 AMP WHEN MEASURED FROM REAR OF SOCKET CONTACT CRIMP BARREL TO OPPOSITE END OF HERMETIC CONNECTOR PIN CONTACT (SEE 1010936).
- (5) INSULATION RESISTANCE (MIL-STD-202, METHOD 302, CONDITION B): 100,000 MEGOHMS, MIN., AT 25°C, 500 VDC; 5000 MEGOHMS, MIN, AT 125°C, 500 VDC

B. MECHANICAL REQUIREMENTS:

- (1) COUPLING MECHANISM: BAYONET LOCKING COUPLING
- (2) MAX ENGAGEMENT FORCE: MIN DISENGAGEMENT FORCE (WITH CONTACTS). PER TABLE I.
- (3) CONTACT RETENTION: 20 LBS. MIN IN DIRECTION OF MATING FORCE.
- (4) ALTITUDE IMMERSION: PER MIL-C-26500.
- (5) DIA OF WIRE INSULATION SHALL BE .034
.054
- (6) OPERATING TEMPERATURE: +125°C, MAX.

TABLE I

| DASH NUMBER | | | NO. OF CONTACTS | α IN DEGREES | DIMENSIONS | | | MAX ENG FORCE (IN-LBS) | MIN DIS-ENG FORCE (IN-LBS) |
|-----------------------|----------------------|-------------------|-----------------|--------------|------------|----------------|--------------|------------------------|----------------------------|
| SOCKET TYPE FIGURE 11 | SOCKET TYPE FIGURE I | PIN TYPE FIGURE 1 | | | A MAX | B | C | | |
| 201 | 001 | 101 | 85 | 0 | 1.390 | 1.092 1.082 | | 28 | 5 |
| 202 | 002 | 102 | | 225 | | | | | |
| 203 | 003 | 103 | | 150 | | | | | |
| 204 | 004 | 104 | | 75 | | | | | |
| 205 | 005 | 105 | 61 | 0 | 1.281 | .976 .948 | | 24 | 4 |
| 206 | 006 | 106 | | 225 | | | | | |
| 207 | 007 | 107 | | 150 | | | | | |
| 208 | 008 | 108 | | 75 | | | | | |
| | 009 | 109 | 44 | 0 | 1.156 | .851 .821 | .931 .869 | 20 | 4 |
| | 010 | 110 | | 225 | | | | | |
| | 011 | 111 | | 150 | | | | | |
| | 012 | 112 | | 75 | | | | | |
| | 013 | 113 | 19 | 0 | .859 | .582 .552 | | 12 | 1 |
| | 014 | 114 | | 225 | | | | | |
| | 015 | 115 | | 150 | | | | | |
| | 016 | 116 | | 75 | | | | | |
| | 017 | 117 | 7 | 0 | .750 | .461 .431 | | 8 | 1 |
| | 018 | 118 | | 225 | | | | | |
| | 019 | 119 | | 150 | | | | | |
| | - | - | - | - | - | - | - | - | - |

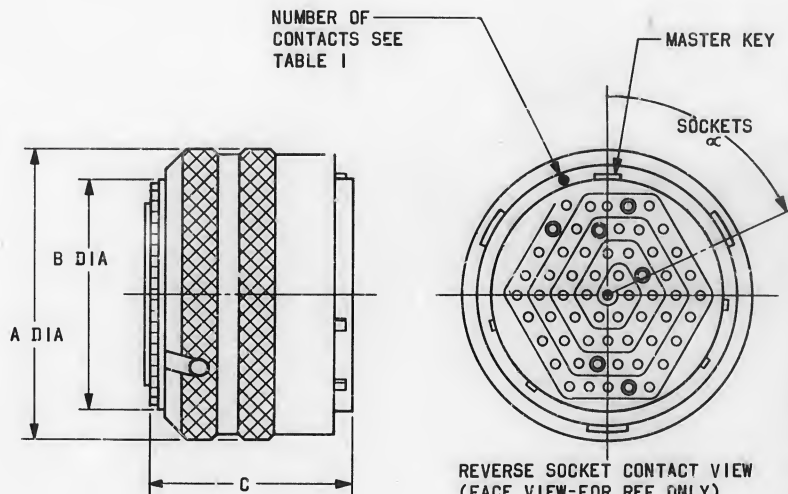
THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

NOTES:

1. FOR MATING HALF SEE DRAWING 1010930 (CRIMP), 1010936 (HERMETIC), OR EQUIVALENT.
2. FOR STRAIN RELIEF CLAMP SEE DRAWING 1010933.
3. SPECIAL TOOLING REQUIRED FOR INSERTION AND REMOVAL OF CONTACTS.
4. ALTERNATE α POSITIONS; THE INSERT, AS SHOWN, IS ROTATED α DEGREES RELATIVE TO THE Q OF THE MASTER KEY AS INDICATED. THIS ALTERATION SHALL NOT BE ACCOMPLISHED BY USER.

| | | |
|-------------|---------|---|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± |
| | | |
| | | |
| | | |
| | | |
| | | DO NOT SCALE THIS DRAWING MATERIAL |
| | | HEAT TREATMENT |
| | | |
| NEXT ASSY | USED ON | FINAL FINISH |
| APPLICATION | | |

| | | | |
|--|-------------------------|--|------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS Contract NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DWG NO | DATE | DRAWN <i>Bender</i> 28 MAR 65 | |
| CHECKED | DATE | CHECKED <i>Ed Feller</i> 25 MAR 65 | |
| APPROVAL | | APPROVAL <i>J. H. Smith</i> | |
| NASA APPROVAL <i>WJ Rhee</i> 5-4-65 | | SPECIFICATION CONTROL DRAWING | |
| MIT APPROVAL <i>W. H. Rhee</i> 4 May 65 | | CODE IDENT NO. SIZE | NASA DRAWING NO. |
| | | 80230 C | 1010929 |
| SCALE | WT | SHEET 2 OF 2 | |



1010929

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4

3

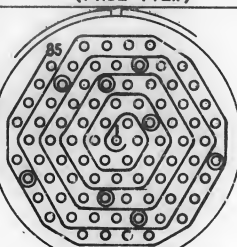
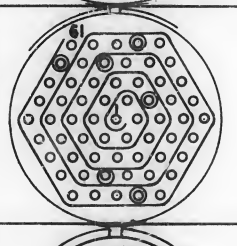
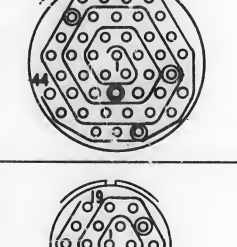
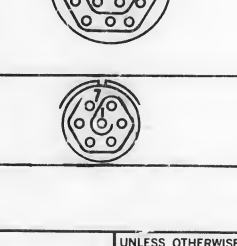
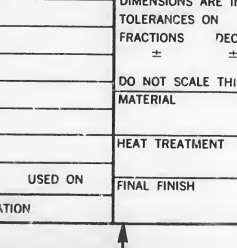
2

1

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0E6 0101

| REVISIONS | | | |
|-----------|----------------------------------|---------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| | INITIAL RELEASE CLASS A PER TDRR | 5-15-65 | W |

| DASH NUMBER | DEGREES ± | NO. OF CONTACT CAVITIES | CONTACT TYPE | DIMENSIONS | | | | | | | STANDARD INSERT ARRANGEMENT (FACE VIEW) | MAX ENG FORCE (IN-LBS) | MIN DISENG FORCE (IN-LBS) |
|-------------|-----------|-------------------------|--------------|------------|----------------|----------------|----------------|--------------|--------------|-------|--|------------------------|---------------------------|
| | | | | A MAX | B | C | D | E | F | G MAX | | | |
| -101 | 0 | 85 | PIN | 1.328 | 1.072 1.052 | 1.126 1.120 | 1.092 1.047 | .462 .431 | .087 .057 | .802 |  | 28 | 5 |
| -102 | W=225 | | | | | | | | | | | | |
| -103 | X=150 | | | | | | | | | | | | |
| -104 | Y=75 | | | | | | | | | | | | |
| -105 | 0 | 61 | PIN | 1.234 | .979 .959 | 1.001 .995 | .972 .938 | .462 .431 | .087 .057 | .802 |  | 24 | 4 |
| -106 | W=225 | | | | | | | | | | | | |
| -107 | X=150 | | | | | | | | | | | | |
| -108 | Y=75 | | | | | | | | | | | | |
| -109 | 0 | 44 | PIN | 1.141 | .916 .896 | .876 .870 | .847 .813 | .462 .431 | .087 .057 | .802 |  | 20 | 4 |
| -110 | W=225 | | | | | | | | | | | | |
| -111 | X=150 | | | | | | | | | | | | |
| -112 | Y=75 | | | | | | | | | | | | |
| -113 | 0 | 19 | PIN | .954 | .729 .709 | .591 .585 | .581 .547 | .462 .431 | .087 .057 | .802 |  | 12 | 1 |
| -114 | W=225 | | | | | | | | | | | | |
| -115 | X=150 | | | | | | | | | | | | |
| -116 | Y=75 | | | | | | | | | | | | |
| -117 | 0 | 7 | PIN | .828 | .604 .584 | .474 .468 | .468 .438 | .462 .431 | .087 .057 | .802 |  | 8 | 1 |
| -119 | 150 | | | | | | | | | | | | |

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

| | | |
|-------------|---------|---|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± |
| | | DO NOT SCALE THIS DRAWING MATERIAL |
| | | HEAT TREATMENT |
| | | FINAL FINISH |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|---|-------------------------|---|-----------------------------|
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS Contract NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>R.P. Dumas</i> DATE <i>25 MAR 65</i> CHECKED <i>Ed Foster</i> 26 MAR 65 APPROVAL <i>R.C. Watson</i> 18 MAY 65 APPROVAL <i>J. L. Smith</i> | | CONNECTOR, RECEPTACLE, ELECTRICAL-SQUARE FLANGE, BAYONET LOCKING COUPLING | |
| NESA APPROVAL <i>W. L. Smith</i> 1/21/65 | | SPECIFICATION CONTROL DRAWING | |
| MIT APPROVAL <i>W. L. Smith</i> 26 May 65 | | CODE IDENT NO. SIZE 80230 C | NESA DRAWING NO. 1010930 |
| SCALE | WT | SHEET 2 OF 3 | |

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3

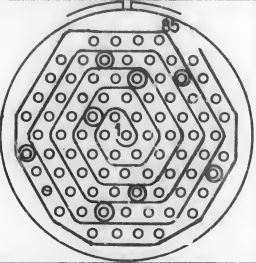
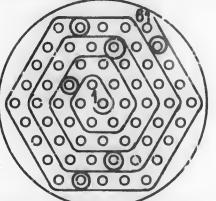
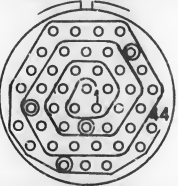


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0060101

| REVISIONS | | | |
|-----------|----------------------------------|------|--------------------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| | INITIAL RELEASE CLASS A PER TDRR | 1961 | <i>[Signature]</i> |

| DASH NUMBER | DEGREES -α | NO. OF CONTACT CAVITIES | CONTACT TYPE | DIMENSIONS | | | | | | | STANDARD INSERT ARRANGEMENT (FACE VIEW) | MAX ENG FORCE (IN-LBS) | MIN DISENG FORCE (IN-LBS) |
|-------------|---------------|-------------------------|--------------|------------|----------------|----------------|----------------|--------------|--------------|-------|--|------------------------|---------------------------|
| | | | | A MAX | B | C | D | E | F | G MAX | | | |
| -001 | 0 | 85 | SOCKET | 1.328 | 1.072 1.052 | 1.126 1.120 | 1.092 1.047 | .462 .431 | .087 .057 | .802 |  | 28 | 5 |
| -002 | W=225 | | | | | | | | | | | | |
| -003 | Y=150 | | | | | | | | | | | | |
| -004 | Y=75 | | | | | | | | | | | | |
| -005 | 0 | 61 | SOCKET | 1.234 | .979 .959 | 1.001 .995 | .972 .938 | .462 .431 | .087 .057 | .802 |  | 24 | 4 |
| -006 | W=225 | | | | | | | | | | | | |
| -007 | X=150 | | | | | | | | | | | | |
| -008 | Y=75 | | | | | | | | | | | | |
| -009 | 0 | 44 | SOCKET | 1.141 | .916 .896 | .876 .870 | .847 .813 | .462 .431 | .087 .057 | .802 |  | 20 | 4 |
| -010 | W=225 | | | | | | | | | | | | |
| -011 | X=150 | | | | | | | | | | | | |
| -012 | Y=75 | | | | | | | | | | | | |
| -013 | 0 | 19 | SOCKET | .954 | .729 .709 | .591 .585 | .581 .547 | .462 .431 | .087 .057 | .802 |  | 12 | 1 |
| -014 | W=225 | | | | | | | | | | | | |
| -015 | X=150 | | | | | | | | | | | | |
| -016 | Y=75 | | | | | | | | | | | | |
| -017 | 0 | 7 | SOCKET | .828 | .604 .584 | .474 .468 | .468 .438 | .462 .431 | .087 .057 | .802 |  | 8 | 1 |
| -019 | 150 | | | | | | | | | | | | |

| | | | |
|---|-------------------------|---|------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS Contract NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>[Signature]</i> DATE <i>2-2-65</i> CHECKED <i>[Signature]</i> DATE <i>26 MAR 65</i> APPROVAL <i>[Signature]</i> DATE <i>18 MAY 65</i> APPROVAL <i>[Signature]</i> | | CONNECTOR, RECEPTACLE, ELECTRICAL-SQUARE FLANGE, BAYONET LOCKING COUPLING | |
| NASA APPROVAL <i>[Signature]</i> DATE <i>5/1-65</i> | | SPECIFICATION CONTROL DRAWING | |
| MIT APPROVAL <i>[Signature]</i> DATE <i>10/1-65</i> | | CODE IDENT NO. SIZE | NASA DRAWING NO. |
| | | 80230 C | 1010930 |
| | | SCALE | WT |
| | | SHEET 3 OF 3 | |

| | | |
|---|---------|--------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± | | |
| DO NOT SCALE THIS DRAWING MATERIAL | | |
| HEAT TREATMENT | | |
| NEXT ASSY | USED ON | FINAL FINISH |
| APPLICATION | | |

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4 3 2 1
V 8860101

| REVISIONS | | | |
|-----------|--|---------|--------------------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| - | INITIAL RELEASE CLASS A PER TDRR 19913 | 6-8-65 | <i>[Signature]</i> |
| A | REVISED PER TDRR 22139 | 6/26/65 | <i>[Signature]</i> |

REQUIREMENTS:

1. GENERAL:

- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.
- PRESERVATION, PACKAGING, PACKING AND CONTAINER MARKING PER ND 1002215 CLASS 1, CODE 3.

2. INSPECTION AND ACCEPTANCE:

A. MECHANICAL REQUIREMENTS:

(1) MATERIAL:

(a) CLAMP: DIE CAST ALUMINUM ALLOY PER MIL-C-26482.

(2) FINISH: CLEAR CONDUCTIVE ANODIZE. FINISH SHALL BE NON-OUTGASSING.

(3) MARKING:

(a) PIECEMARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.

(b) PACKAGE: INTERNAL INDIVIDUAL OR COLLECTIVE PACKAGES AND EXTERNAL PACKAGING SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

SUPPLIER'S NAME
NASA PART NUMBER AND REVISION LETTER
DATE CODE, OR DATE OF MANUFACTURE

(c) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.

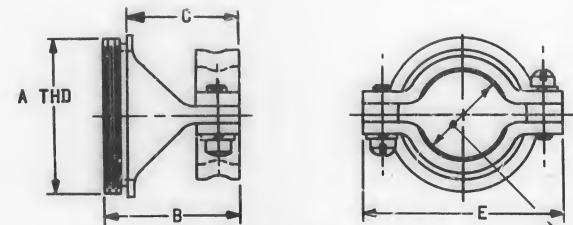


FIGURE 1
STRAIGHT STRAIN RELIEF CLAMP

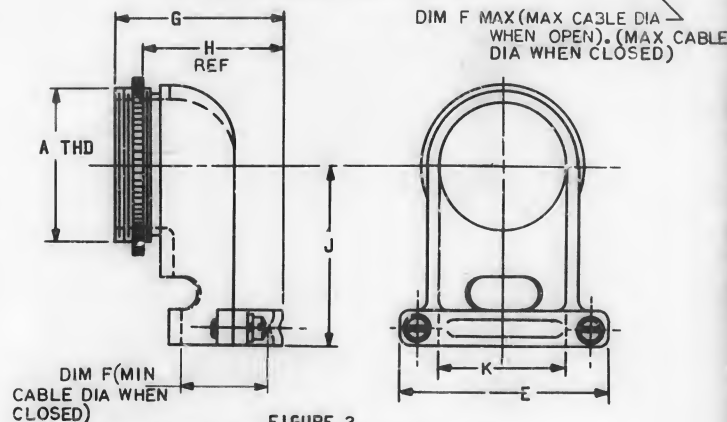


FIGURE 2
RIGHT-ANGLE STRAIN RELIEF CLAMP

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | | |
|-------------|---------|---|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON |
| | | FRACTIONS DECIMALS ANGLES |
| | | ± — ± — ± — |
| | | DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE REQUIREMENTS |
| | | HEAT TREATMENT |
| | | NONE |
| NEXT ASSY | USED ON | FINAL FINISH |
| APPLICATION | | SEE REQUIREMENTS |

| | | | | |
|--|----------------------------|--|-----------|-----------------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | | FIND NO. |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS Dwg. No. Contract NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>[Signature]</i> DATE <i>25 MAR 65</i> CHECKED <i>[Signature]</i> DATE <i>6-2-65</i> APPROVAL <i>[Signature]</i> DATE <i>6-2-65</i> APPROVAL <i>[Signature]</i> | | CLAMP, CABLE, ELECTRICAL CONNECTOR - SUBMINIATURE | | |
| SPECIFICATION CONTROL DRAWING | | | | |
| NASA APPROVAL <i>[Signature]</i> | | CODE IDENT NO. 80230 | SIZE C | NASA DRAWING NO. 1010933 |
| MIT APPROVAL <i>[Signature]</i> | | SCALE NONE | WT | SHEET 1 OF 2 |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY OMISSION, MISTAKE, AND THE FACT THAT THE GOVERNMENT HAS FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED AS IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREIN.

▽ EE60101

| REVISIONS | | | |
|-----------|--|---------|--------------------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| — | INITIAL RELEASE CLASS A PER TDRR 19713 | 6-8-65 | <i>[Signature]</i> |
| A | REVISED PER TDRR 22-39 | 9/28/66 | <i>WJK</i> |

| DASH NUMBER | FIG. NO. | FOR USE WITH CONNECTOR (SHELL SIZE) | | DIMENSIONS | | | | | | | | | |
|-------------|----------|-------------------------------------|--------------|---------------|-------|-------|---------|---------|------|---------|-------|---------|---------|
| | | PUSH-PULL TYPE | BAYONET TYPE | A | B MAX | C MAX | E ±.015 | F (REF) | | G ±.015 | H MAX | J ±.015 | K ±.015 |
| | | | | | | | | MIN | MAX | | | | |
| -100 | 1 | - | 8 | 3/8-32UNEF-2A | .555 | .447 | .694 | .163 | .260 | — | — | — | — |
| -101 | 1 | 3 | 10 | 1/2-28UNEF-2A | .555 | .447 | .792 | .245 | .370 | — | — | — | — |
| -102 | 1 | 7 | — | 5/8-24UNEF-2A | .555 | .447 | .940 | .375 | .443 | — | — | — | — |
| -103 | 1 | 12 | 14 | 3/4-20UNEF-2A | .790 | .695 | 1.012 | .435 | .578 | — | — | — | — |
| -104 | 1 | 19 | 16 | 7/8-20UNEF-2A | .790 | .695 | 1.166 | .585 | .703 | — | — | — | — |
| -105 | 1 | 27 | 18 | 1-20UNEF-2A | .790 | .695 | 1.414 | .665 | .906 | — | — | — | — |
| -200 | 2 | - | 8 | 3/8-32UNEF-2A | — | — | .694 | .111 | — | .656 | .516 | .797 | .188 |
| -201 | 2 | 3 | 10 | 1/2-28UNEF-2A | — | — | .792 | .192 | — | .750 | .609 | .859 | .270 |
| -202 | 2 | 7 | — | 5/8-24UNEF-2A | — | — | .940 | .323 | — | .891 | .734 | .922 | .400 |
| -203 | 2 | 12 | 14 | 3/4-20UNEF-2A | — | — | 1.012 | .383 | — | .969 | .928 | .984 | .460 |
| -204 | 2 | 19 | 16 | 7/8-20UNEF-2A | — | — | 1.166 | .533 | — | 1.109 | .969 | 1.047 | .610 |
| -205 | 2 | 27 | 18 | 1-20UNEF-2A | — | — | 1.414 | .675 | — | 1.375 | 1.219 | 1.156 | .814 |

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

| | | | |
|--|-------------------------|---|-----------------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE MASS 02139 CONTRACT NO. NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>GRABNER</i> DATE <i>28-MAR-65</i> CHECKED <i>FOSTER</i> DATE <i>25-MAR-65</i> APPROVAL <i>PCW</i> DATE <i>June 2, 1965</i> APPROVAL <i>JT Kruis</i> DATE <i>6/3/65</i> | | CLAMP, CABLE, ELECTRICAL, CONNECTOR - SUBMINIATURE | |
| HEAT TREATMENT | | SPECIFICATION CONTROL DRAWING | |
| NEXT ASSY | USED ON | NASA APPROVAL <i>[Signature]</i> DATE <i>6/1/65</i> | NASA DRAWING NO. 1010933 |
| APPLICATION | | MIT APPROVAL <i>[Signature]</i> DATE <i>6/1/65</i> | CODE IDENT NO. 80230 SIZE C |
| | | SCALE | WT |
| | | SHEET 2 OF 2 | |

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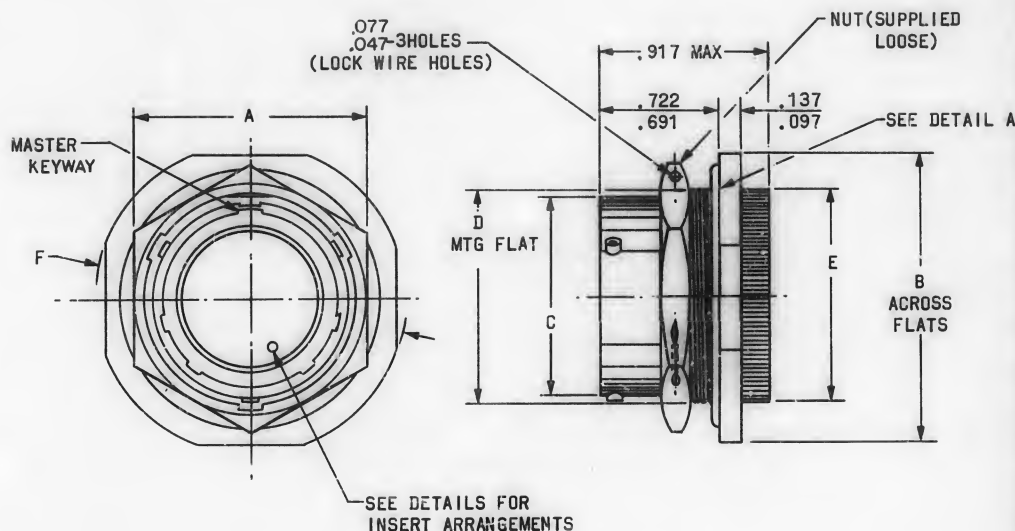
REQUIREMENTS:

1. GENERAL:

- A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- B. UNITS DESCRIBED HEREIN SHALL CONFORM TO ALL THE APPLICABLE ENVIRONMENTAL REQUIREMENTS OF MIL-C-26482 FOR BAYONET-LOCK COUPLING, NUT MOUNTING, CLASS E SEAL, PIN OR SOCKET CONTACT CONNECTORS WITH SHELL AND INSERT SIZES, AS DELINEATED ON THIS DRAWING.
- C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS CONTAINED IN ND 1015404, CLASS 2.
- D. UNITS SHALL BE CAPABLE OF MEETING THE APPLICABLE QUALIFICATION REQUIREMENTS OF MIL-C-26482.
- E. MARKING: UNITS SHALL BE MARKED IN ACCORDANCE WITH ND 1002019 WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, NASA PART NUMBER, AND DATE CODE OR DATE OF MANUFACTURE. THE MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PART.
- F. PRESERVATION, PACKAGING, PACKING AND CONTAINER MARKING PER ND 1002215, CLASS 1, CODE 3.

2. INSPECTION AND ACCEPTANCE:

- A. ELECTRICAL CHARACTERISTICS WHEN TESTED USING CONTACTS PER 1010770.
 - (1) INSULATION RESISTANCE: (MIL-STD-202, METHOD 302, CONDITION B)
 - (a) AT 25°C; 100,000 MEGOHMS MINIMUM AT 500 VDC.
 - (b) AT 125°C; 5,000 MEGOHMS MINIMUM AT 500 VDC.
 - (2) DIELECTRIC WITHSTANDING VOLTAGE: (MIL-STD-202, METHOD 301) 375 VRMS AT 70,000 FT ALTITUDE. 1500 VRMS AT SEA LEVEL.
- B. VENDOR SUPPLIED DATA: EACH SHIPMENT OF PARTS SHALL BE ACCOMPANIED BY THE FOLLOWING DOCUMENTATION:
 - (1) CERTIFICATE OF COMPLIANCE WITH ALL DESIGN REQUIREMENTS.
 - (2) CERTIFICATE OF COMPLIANCE WITH ND 1015404, CLASS 2.



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

| | | | |
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| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | |
| | | FRACTIONS | DECIMALS |
| | | ± | ± |
| | | DO NOT SCALE THIS DRAWING | |
| | | MATERIAL | |
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| | | HEAT TREATMENT | |
| | | NONE | |
| | | FINAL FINISH | |
| | | SEE REQUIREMENTS | |
| NEXT ASSY | USED ON | | |
| APPLICATION | | | |

| | | | | |
|--|-------------------------|--|-------------|------------------|
| QTY REQD | PART OR IDENTIFYING NO. | SYMBOL | DESCRIPTION | FIND NO. |
| | | | | |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE MASS 02139 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DWG NO. | DATE | CONNECTOR, RECEPTACLE, ELECTRICAL - MINIATURE, PANEL NUT MOUNT, BAYONET LOCKING COUPLING | | |
| DRAWN | 25 MAR 65 | SPECIFICATION CONTROL DRAWING | | |
| CHECKED | 26 APR 65 | | | |
| APPROVAL | 18 MAY 65 | | | |
| NASA APPROVAL | | CODE IDENT NO. | SIZE | NASA DRAWING NO. |
| | | 80230 | C | 1010937 |
| MIT APPROVAL | | SCALE | NONE | WT |
| | | SHEET 1 OF 3 | | |

NOTICE - WHEN IN ANY PART OF THIS DRAWING, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT ASSUMES NO RESPONSIBILITY AND ANY RELIATION UNLAWFULLY. AND THE FACT THAT THE GOVERNMENT HAS BEEN FORMULATED, FORWARDED, OR IN ANY WAY SUPPLIED THE DATA DRAWING, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY ANY PERSON OR ORGANIZATION AS AN ENDORSEMENT OR RECOMMENDATION OF THE UNITED STATES GOVERNMENT. NO COPY OF THIS DRAWING OR SPECIFICATIONS OR OTHER DATA SHALL BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS ORIGINALLY INTENDED.

REQUIREMENTS: (CONTINUED)

3. DESIGN:

A. OPERATING LIFE (DURABILITY): 200 MINIMUM MATINGS AND UN-MATINGS USING PLUG SCD 1010929 AND CONTACTS PER SCD 1010770.

B. ELECTRICAL CHARACTERISTICS (RATINGS):

- (1) CONTACT CURRENT RATINGS: 3 AMPERES MAXIMUM.
- (2) VOLTAGE RATING: 250 VOLTS RMS OR 350 VDC.
- (3) CONTACT RESISTANCE: 7 MILLIVOLTS MAX AT 3 AMPERES WHEN MEASURED FROM THE REAR OF THE SOCKET CONTACT CRIMP BARREL.

C. MECHANICAL REQUIREMENTS:

- (1) COUPLING MECHANISM: BAYONET LOCKING COUPLING.
- (2) ENGAGING AND DISENGAGING FORCE: PER SCD 1010929.
- (3) MOUNTING: SHALL MOUNT TO A .125 MAXIMUM PANEL.
- (4) CONTACT RETENTION: 20 LBS MIN IN DIRECTION OF MATING FORCES.
- (5) ALTITUDE IMMERSION, PER MIL-C-26500.

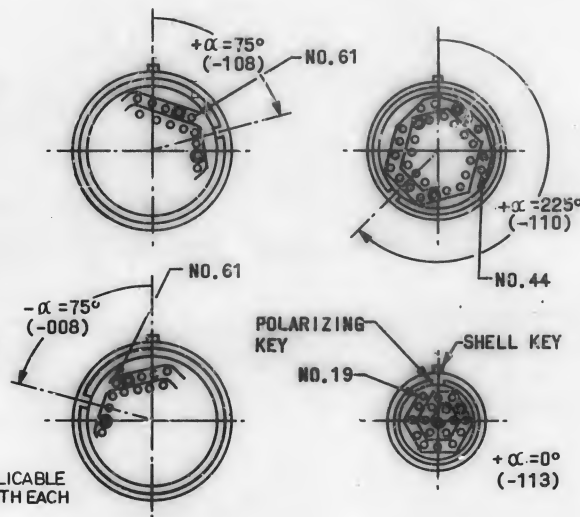
D. MATERIAL AND FINISH:

- (1) SHELL AND HEX NUT: ALUMINUM ALLOY AS REQUIRED BY MIL-C-26482 WITH A CLEAR CONDUCTIVE ANODIZE (NON-OUTGASSING).
- (2) INSERT: SOLID DIELECTRIC PER MIL-M-14, TYPE MFH OR EQUIVALENT. THIS MATERIAL SHALL BE NON-TOXIC OUTGASSING.
- (3) PANEL SEAL AND INSERT GROMMET: METHYL-VINYL SILICONE RUBBER.

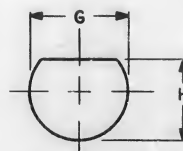
E. ACCESSORY PARTS:

- (1) MATING PLUGS: PER SCD 1010929.
- (2) CRIMP TYPE CONTACTS (100% MIN. OF CONTACT CAVITIES) AND APPLICABLE SEALING PLUGS (15% MIN. OF CONTACT CAVITIES) TO BE SUPPLIED WITH EACH UNIT. (SEE TABLE I.)

+ α (CW) = PINS
- α (CCW) = SOCKETS



DETAILS-TYPICAL POLARIZATION (FACE VIEW)
(FOR REFERENCE)



PANEL MOUNTING HOLE
(REF)

| | | | |
|---|-------------------------|--|--------------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS 02139 CONTRACT | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>[Signature]</i> DATE <i>26 APR 65</i> CHECKED <i>[Signature]</i> APPROVAL <i>[Signature]</i> | | CONNECTOR, RECEPTACLE, ELECTRICAL - MINIATURE, PANEL NUT MOUNT, BAYONET LOCKING COUPLING | |
| NASA APPROVAL <i>[Signature]</i> | | CODE IDENT NO. 80230 | NASA DRAWING NO. 1010937 |
| MIT APPROVAL <i>[Signature]</i> | | SCALE | SHEET 2 OF 3 |

| | | |
|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | |
| FRACTIONS | DECIMALS | ANGLES |
| ± | ± | ± |
| DO NOT SCALE THIS DRAWING | | |
| MATERIAL | | |
| HEAT TREATMENT | | |
| NEXT ASSY | USED ON | FINAL FINISH |
| APPLICATION | | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A SPECIFICALLY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY ASSUMES NO RESPONSIBILITY FOR ANY OMISSIONS, ERRORS, OR THE FACT THAT THE GOVERNMENT DATA HAVE BEEN FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED AS IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON FOR REPRODUCTION, OR CONVERTING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREIN.

7 2E360101

| REVISIONS | | | |
|-----------|--|---------|----------|
| SYM | DESCRIPTION | DATE | APPROVAL |
| | INITIAL RELEASE CLASS A PER TDRR 19610 | 7/6/65 | WR |
| A | REVISED PER TDRR 22821 | 10/5/65 | WR |

TABLE I

| DASH NUMBER (SOCKETS) | DASH NUMBER (PINS) | INSERT POLARIZING ANGLE $\pm \infty$ | CONTACTS ACCOMMODATED | SHELL SIZE TABLE II |
|-----------------------|--------------------|--------------------------------------|-----------------------|---------------------|
| 001 | -101 | 0° | 85 | 18 |
| 002 | -102 | 225° | | |
| 003 | -103 | 150° | | |
| 004 | -104 | 75° | | |
| 005 | -105 | 0° | 61 | 16 |
| 006 | -106 | 225° | | |
| 007 | -107 | 150° | | |
| 008 | -108 | 75° | | |
| 009 | -109 | 0° | 44 | 14 |
| 010 | -110 | 225° | | |
| 011 | -111 | 150° | | |
| 012 | -112 | 75° | | |
| 013 | -113 | 0° | 19 | 10 |
| 014 | -114 | 225° | | |
| 015 | -115 | 150° | | |
| 016 | -116 | 75° | | |
| 017 | -117 | 0° | 7 | 8 |
| — | — | — | — | — |
| 019 | -119 | 150° | 7 | 8 |

TABLE II

| SHELL SIZE | DIMENSIONS | | | | | | | | MAXIMUM ENGAGING FORCE (IN-LBS) | MAXIMUM DISENGAGING FORCE (IN-LBS) |
|------------|------------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|------------------------------------|
| | A | B | C | D | E | F | G | H | | |
| 18 | 1.454 | 1.640 | 1.126 | 1.191 | 1.082 | 1.765 | 1.269 | 1.208 | 28 | 5 |
| | 1.422 | 1.610 | 1.120 | 1.161 | 1.057 | 1.735 | 1.259 | 1.198 | | |
| 16 | 1.328 | 1.515 | 1.001 | 1.066 | .947 | 1.613 | 1.144 | 1.084 | 24 | 4 |
| | 1.296 | 1.485 | .995 | 1.056 | .922 | 1.583 | 1.134 | 1.074 | | |
| 14 | 1.204 | 1.390 | .876 | .942 | .822 | 1.515 | 1.017 | .955 | 20 | 4 |
| | 1.172 | 1.360 | .870 | .932 | .797 | 1.485 | 1.007 | .945 | | |
| 10 | .891 | 1.077 | .591 | .655 | .565 | 1.202 | .707 | .669 | 12 | 1 |
| | .859 | 1.047 | .585 | .645 | .540 | 1.172 | .697 | .659 | | |
| 8 | .766 | .952 | .474 | .530 | .445 | 1.077 | .582 | .542 | 8 | 1 |
| | .734 | .922 | .468 | .520 | .420 | 1.047 | .572 | .532 | | |

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

| | | |
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| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON |
| | | FRACTIONS DECIMALS ANGLES |
| | | ± ± ± |
| | | DO NOT SCALE THIS DRAWING MATERIAL |
| | | |
| | | HEAT TREATMENT |
| NEXT ASSY | USED ON | FINAL FINISH |
| APPLICATION | | |

| | | | |
|--|---|--|--------------------------|
| QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIG NO. |
| LIST OF MATERIALS | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS Contract NAS 9-497 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>[Signature]</i> DATE <i>30 MAR 65</i> | CONNECTOR, RECEPTACLE, ELECTRICAL - MINIATURE, PANEL NUT MOUNT, BAYONET LOCKING COUPLING SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>[Signature]</i> | | | |
| APPROVAL <i>[Signature]</i> 18 MAY 65 | | | |
| APPROVAL <i>[Signature]</i> 24 MAY 65 | | | |
| NASA APPROVAL <i>[Signature]</i> 1/24/65 | CODE IDENT NO. 80230 | SIZE C | NASA DRAWING NO. 1010937 |
| MIT APPROVAL <i>[Signature]</i> | SCALE | WT | SHEET 3 OF 3 |

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| REVISIONS | | | | | |
|-----------|------|---|----|-----|---------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE |
| - | | INITIAL RELEASE CLASS A PER TORR 18617 | | | 4-27-68 |

REQUIREMENTS

1. GENERAL:

- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 3.
- EACH UNIT AND SHIPPING CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED PER ND 1002019 WITH THE MANUFACTURER'S NAME AND SYMBOL, ITEM NAME, NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS AND DATE OF MANUFACTURE.
- PACKAGING SHALL BE IN ACCORDANCE WITH ND 1002215 CLASS I EXCEPT WIRE SHALL BE FURNISHED ON SPOOLS WITH 16" FLANGE DIA., 12" DRUM DIA., 2-1/2" TRAVERSE, AND 1-1/4" HOLE DIA.

2. ACCEPTANCE AND INSPECTION:

- CONDUCTOR SOLID: #30 AWG (0.010 \pm 0.0003) DIA, NON-MAGNETIC, HIGH STRENGTH CADMIUM CHROME COPPER ALLOY (98% COPPER MINIMUM);
-0.0001
SILVER PLATED 40 MICRO-INCHES MINIMUM PER ASTM-B-298-58T.

WORKMANSHIP:

- THE SURFACE OF THE FINISHED WIRE SHALL BE CLEAN, SMOOTH, FREE FROM FOREIGN RESIDUE AND FREE FROM VISIBLE BLEMISHES. THERE SHALL BE NO IMPERFECTIONS WHICH INCREASE THE OVERALL DIAMETER SO AS TO EXCEED THE MAXIMUM SPECIFIED. THE INSULATION SHALL BE UNIFORM THROUGHOUT AND FREE FROM ANY DEFECTS SUCH AS INCLUSIONS, RADIAL CRACKS, PINHOLES, DISCOLORATION OF CONDUCTOR OR INSULATION WHICH MAY AFFECT ITS SERVICEABILITY OR REQUIRE SPECIAL HANDLING.

3. DESIGN REQUIREMENTS:

- VOLTAGE RATING: 300 V R.M.S.
- TEMPERATURE: +105°C MAXIMUM CONTINUOUS
- INSULATION: 0.020 \pm 0.0015 O.D. POLYETHYLENETEREPHALATE (BIAXIALLY ORIENTED) FILM, THERMOPLASTIC LAMINATE THE POLYETHYLENETEREPHALATE SHALL BE ADJACENT TO THE CONDUCTOR.
- INSULATION COLOR: PER TABLE I.
- FLAMMABILITY: 30 SECONDS MAXIMUM BURNING TIME FOR 3 INCHES MAXIMUM FLAME TRAVEL WHEN TESTED PER MIL-W-16878.
- INSULATION CUT THROUGH: SPECIMENS OF THE WIRE SHALL RESIST THE PENETRATION OF THE UNDERWRITERS LABORATORY STANDARD PENETRATION APPARATUS USING A METAL BLADE WITH A 90° ANGLE AND .003-INCH (\pm 0.002) RADIUS EDGE OF THE POINT OF CONTACT. THE BLADE SHALL BE LOADED WITH 750 GRAMS AND SHALL BE APPLIED TO THE INSULATED WIRE FOR A PERIOD OF 24 HOURS WHILE MAINTAINED AT + 50°C. DURING THIS PERIOD, A POTENTIAL OF 100VOLTS RMS MIN SHALL BE APPLIED BETWEEN THE BLADE AND THE METAL CONDUCTOR OF THE SPECIMEN AND NO ELECTRICAL CONTINUITY SHALL OCCUR.
- DIELECTRIC CONSTANT: 4.0 MAX AT 60 CPS AND +77°F. WHEN TESTED PER FED-STD-406 METHOD 4021.
- RESISTANCE, DC: 125 OHMS MAX PER 1000 FEET, WHEN TESTED PER METHOD 303 OF MIL-STD-202.

PROCURE ONLY FROM APPROVED SOURCE LISTED IN ND1002034 FOR THIS DRAWING.

| | | | | |
|---|-------------------------|--|-----------------------------|--------|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIN NO |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>A. P. Adams Jr.</i> 4-17-68 | | WIRE | | |
| CHECKED <i>A. M. S.</i> 4-23-68 | | POLYETHYLENETEREPHALATE, INSULATION | | |
| APPROVED <i>D. R. Test</i> 4-23-68 | | SOLID, COPPER ALLOY, SILVER PLATE | | |
| APPROVED | | SPECIFICATION CONTROL DRAWING | | |
| APPROVED MIT | CODE IDENT NO. | SIZE | DRAWING NO. | |
| APPROVED MSC | DATE | SCALE NONE | 1010940 | |
| SHEET 1 OF 2 | | | | |

4

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1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFERRING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

| REVISIONS | | | | | | |
|-----------|------|---|----|-----|---------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| - | | INITIAL RELEASE CLASS A PER TDOR 19617 | | | 4-27-65 | WK |

- K. INSULATION RESISTANCE: 2,500 MEGOHMS/1000 FEET MINIMUM WHEN TESTED PER MIL-W-16878, IMMERSSED IN WATER, WITH A WETTING AGENT
- L. TENSILE STRENGTH: 55 TO 73 THOUSAND PSI WHEN TESTED PER FEDERAL STANDARD 151 METHOD 211
- M. COLD BEND: INSULATION SHALL WITHSTAND 1000 VOLTS, RMS MIN AFTER 4 HOURS AT -65°C AND BENT AROUND A 1/2 INCH MANDREL.
- N. HEAT RESISTANCE: INSULATION SHALL WITHSTAND 1000 VOLTS RMS MIN AFTER 96 HOURS AT +130°C.
- P. ELONGATION: 8 TO 14 PERCENT WHEN TESTED PER FEDERAL STANDARD 151 METHOD 211.
- R. CONCENTRICITY, CONDUCTOR: THE MINIMUM THICKNESS OF THE INSULATION SHALL NOT BE LESS THAN 41 PER CENT OF THE DIFFERENCE BETWEEN THE MEASURED DIAMETER OVER THE INSULATION AND THE MEASURED DIAMETER OVER THE CONDUCTOR OR NOT LESS THAN 70 PER CENT OF THE MAXIMUM THICKNESS AT THAT CROSS SECTION.
- S. INSULATION PULL OFF FORCE: 8 OUNCES MINIMUM, 2-1/2 POUNDS MAXIMUM
- (1) A SIX (6) INCH LENGTH OF WIRE SHALL BE STRIPPED 1-1/2 INCHES ON EACH END. ONE END OF THE WIRE SHALL BE PASSED THROUGH A HOLE IN A METAL PLATE WHOSE DIAMETER IS 0.0125. THE END OF THE WIRE WHICH PASSES THROUGH THE PLATE SHALL THEN BE PULLED IN SUCH MANNER AS TO MEASURE THE FORCE REQUIRED TO PULL THE WIRE THROUGH THE INSULATION.
- T. MINIMUM CONTINUOUS (UNSPliced) LENGTH: 100 FEET MINIMUM, WITH A 1000 FOOT AVERAGE.
- U. SPLICES OF THE CONDUCTOR SHALL BE ELECTROWELDED BEFORE FINAL DRAWING AND SHALL BE OF THE BUTT TYPE. 2" ON EITHER SIDE OF SPLICE SHALL BE STRIPPED OF INSULATION.
- V. DIELECTRIC STRENGTH: THE DIELECTRIC STRENGTH SHALL BE 1000 VOLTS RMS MIN AND SHALL BE TESTED PER MIL-W-16878. IMMERSSED IN WATER CONTAINING A WETTING AGENT.
- W. WIRE, CURL, MINIMUM: WHEN A 30 INCH LENGTH OF WIRE IS CUT FROM BARREL OR SPOOL, THE WIRE, WHEN LYING UNRESTRICTED ON A SMOOTH FLAT SURFACE SHALL NOT CURL UP TO A DIAMETER OF LESS THAN 10 INCHES WITHIN ONE (1) MINUTE AT ROOM AMBIENT CONDITIONS.
4. APPLICATION: WIRE MAY BE USED ONLY WHEN ENCAPSULATED.

TABLE I

| DASH NO. | COLOR |
|----------|--------|
| 001 | WHITE |
| 002 | RED |
| 003 | BLUE |
| 004 | YELLOW |

| | | | | |
|-------------|---------|--|--|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ f RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES ± _____ ± _____ ± _____ DO NOT SCALE THIS DRAWING | | |
| | | MATERIAL _____ | | |
| NEXT ASSY | USED ON | | | |
| APPLICATION | | | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|--|-------------------------|-------------------|--|-------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| DRAWN <i>J. Addams</i> <i>MNR/70</i> | | | WIRE | |
| CHECKED <i>A. M. 2/7/65</i> <i>4-23-65</i> | | | POLYETHYLENETEREPHALATE, INSULATION | |
| APPROVED <i>A. M. 2/7/65</i> <i>4-23-65</i> | | | SOLID, COPPER ALLOY, SILVER PLATE | |
| APPROVED | | | SPECIFICATION CONTROL DRAWING | |
| APPROVED MIT | <i>W. J. 2/7/65</i> | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC | <i>W. J. 2/7/65</i> | DATE | SCALE NONE | 1010940 |
| | | | SHEET 2 OF 2 | |

4

3

2

1

REQUIREMENTS

- A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-C-70327
- B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS CONTAINED IN DD 1015404, CLASS 1
- C. PART MARKING: UNITS SHALL BE MARKED: PER NO 1002019, ON THE SURFACE(S) INDICATED: WITH THE MANUFACTURER'S SYMBOL, LOT CODE NUMBER AND PART NUMBER (DRAWING NUMBER AND DASH NUMBER).
- D. SERIALIZATION: EACH PART SHALL BE MARKED WITH A SERIAL NUMBER PER NO 1002023.
- E. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH NO 1002215, CLASS 11.

2. INSPECTION AND ACCEPTANCE:

- A. ELECTRICAL REQUIREMENTS: 100% INSPECTION
1. TABS TO BE INTERCONNECTED PER DATA CARDS DEFINED ON SHEET 4. CARDS AND/OR LISTINGS AVAILABLE UPON REQUEST FROM MIT/IL
 2. INSULATION RESISTANCE: 30 MEGOHM MINIMUM. CIRCUITS SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 302, AT 100 VOLTS DC.
 3. CONDUCTOR RESISTANCE: THE DC RESISTANCE OF ANY CONDUCTOR SHALL BE LESS THAN 0.3 OHMS WHEN TESTED IN ACCORDANCE WITH MIL-STD-202 METHOD 303.
 4. A CERTIFICATE OF COMPLIANCE FOR ELECTRICAL REQUIREMENTS SHALL BE INCLUDED FOR EACH UNIT.
- B. MECHANICAL REQUIREMENTS: SAMPLE
1. DIMENSION: AS SHOWN
3. DESIGN REQUIREMENTS

3. DESIGN REQUIREMENTS

- B. CIRCUIT BOARD INTERCONNECTIONS SHALL BE CAPABLE OF PROVIDING LOGIC FUNCTIONS AS SHOWN ON APPLICABLE LOGIC FLOW DIAGRAM WHEN DUAL INDR GATES (FLAT PAKS) ARE ASSEMBLED PER DRAWING 2003083.

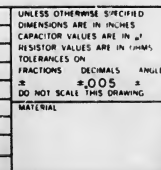
| REVISIONS | | | | | | |
|-----------|------|---|-----|-----|---------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| — | | INITIAL RELEASE CLASS B PER TDRR 22758 | | | 5-28-65 | |
| | | REVISED PER TDRR 23173 | WBT | | 6/14/65 | WLT |
| B | | REVISED PER TDRR 23983 | TB | WLT | 6/14/65 | WLT |
| C | | REVISED AND UPGRADED TO CLASS A PER TDRR 25131 | WBT | | 1/16/66 | WLT |

| | | | | | | | | | | | |
|-------------|--|---|--|---|--|---|--|--|--|------------|--|
| | | QTY REQD | | PART IDENTIFYING NO. | | MATERIAL OR NOTES | | NOMENCLATURE OR DESCRIPTION | | FIN FIN | |
| | | | | MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | LIST OF MATERIALS | | | | | |
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES DO NOT SCALE THIS DRAWING MATERIAL | | DRAWN CHECKED APPROVED APPROVED | | MAHED SPACECRAFT CENTER HOUSTON, TEXAS | | PRINTED CIRCUIT BOARD SPECIFICATION CONTROL DRAWING | | | |
| NEXT ASSY | | USED ON | | APPROVED MIT ASC | | CODE IDENT NO SIZE 80230 D | | DRAWING NO. 1010985 | | | |
| APPLICATION | | | | DATE | | SCALE | | SHEET | | OF 1 | |

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A

1



QTY
REQD

106

PART OR NTIFYING

NO

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| MATERIALS | OR NO |
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| AL | |
| ES | |

NOME

DECLARATION OF INTEREST

OR

| | |
|---------|--|
| FIND NO | |
|---------|--|

| REVISIONS | | | | |
|-----------|-----|--|---------|-------|
| ZONE | SYM | DESCRIPTION | DATE | APPD. |
| | - | INITIAL RELEASE CLASS A PER TDRR 20392 | 6-28-65 | |
| | | | | |
| | | | | |

REQUIREMENTS:

1. GENERAL:

- A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.
- B. SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 3.
- C. EACH SHIPPING AND UNIT CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE
NASA DRAWING NUMBER AND REVISION LETTER,
LOT NUMBER, EXPIRATION DATE FOR
MATERIAL IN UNOPENED CONTAINERS, IN ADDITION TO ALL MARKING
REQUIREMENTS DESCRIBED IN MIL-P-23377.
- D. THE EPOXY-POLYAMIDE PRIMER SHALL CONSIST OF A PIGMENTED EPOXY RESIN BASE AND A POLYAMIDE CONVERTER, BOTH FORMULATED IN ACCORDANCE WITH MIL-P-23377. THE PRIMER COATING SHALL BE SUPPLIED IN A KIT PACKAGED AS A UNIT CONSISTING OF EQUAL VOLUMES OF THE TWO MATERIALS.

2. ACCEPTANCE AND INSPECTION:

- A. THE MATERIAL SHALL BE A TWO COMPONENT EPOXY-POLYAMIDE CHEMICAL AND SOLVENT RESISTANT PRIMER COATING WITH THE FOLLOWING PROPERTIES.

- (1) TOTAL NON-VOLATILE CONTENT: THE TOTAL NON-VOLATILE CONTENT AS PERCENT BY WEIGHT, WHEN DETERMINED IN ACCORDANCE WITH METHOD NO. 4041 OF FEDERAL TEST METHOD STANDARD NO. 141 SHALL BE:
- (a) COMPONENT I, PIGMENTED EPOXY RESIN BASE $-61 \pm 1\%$. 1010992-1
- (b) COMPONENT II, POLYAMIDE CONVERTER $-21.5 \pm 0.5\%$. 1010992-2
- (2) CONDITION IN CONTAINER: COMPONENT I SHALL BE CAPABLE OF BEING EASILY MIXED TO A SMOOTH HOMOGENEOUS CONDITION WHICH SHALL BE POURABLE. THERE SHALL BE NO TRACE OF GRIT, COARSE PARTICLES, OR SEPARATION OF PIGMENT. A CLOSED CONTAINER, AFTER TWO WEEKS STANDING, SHALL SHOW NO EVIDENCE OF HARD OR OBJECTIONABLE SETTLING WHICH CANNOT BE REDISPERSED READILY WITH A PADDLE TO A HOMOGENEOUS STATE. COMPONENT II SHALL BE CLEAR, HOMOGENEOUS AND FREE FROM SUSPENDED MATTER. THE TEST METHOD SHALL BE 3011 OF FEDERAL TEST METHOD STANDARD NO. 141.
- (3) COLOR: THE COLOR OF THE ADMIXED PRIMER SHALL APPROXIMATELY MATCH COLOR 34552 OF FEDERAL STANDARD 595 WHEN TESTED TO METHOD 4250 OF FEDERAL TEST METHOD STANDARD NO. 141.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON
ND 1032034 FOR THIS DRAWING.

| | | | | | | | |
|-------------|--|---|----------|---|--------------------------------------|---|---------|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| | | FRACTIONS | DECIMALS | ANGLES | DWG NO | CONTRACT | |
| | | + | + | + | DRAWN <i>Bender</i> | DATE <i>11-JUN-65</i> | |
| | | - | - | - | CHECKED <i>J. A. Gagnaire</i> | DATE <i>11-JUN-65</i> | |
| | | | | | APPROVAL <i>J. R. Test</i> | DATE <i>6/24/65</i> | |
| | | DO NOT SCALE THIS DRAWING | | | APPROVAL | | |
| | | MATERIAL | | | NASA APPROVAL <i>6-28-65</i> | | |
| | | SEE REQUIREMENTS | | | MIT APPROVAL <i>W. J. J. 6/28/65</i> | | |
| NEXT ASSY | | USED ON | | SCALE | | CODE IDENT NO. | SIZE |
| APPLICATION | | CONTRACT NAS 9-497 | | 80230 | | C | 1010992 |
| | | | | | | SHEET | 1 OF 2 |

REQUIREMENTS CONTINUED:

3. DESIGN:

- A. THE DESIGN REQUIREMENTS OF THIS SPECIFICATION REQUIRES MATERIAL CONFORMING TO ALL THE REQUIREMENTS PRESCRIBED IN MIL-P-23377.
- B. SHELF LIFE: WHEN STORED IN UNOPENED CONTAINERS AT TEMPERATURES BELOW 80°F, THE MATERIALS SHALL HAVE A MINIMUM OF 10 MONTHS USABLE SHELF LIFE WHEN RECEIVED BY THE PURCHASER.
- C. INTENDED USE: THE MATERIAL IS INTENDED TO BE USED AS A PAINT PRIMER PRELIMINARY TO APPLICATION OF 1010729 EPOXY PAINT.

| REVISIONS | | | | |
|-----------|-----|--|---------|-------|
| ZONE | SYM | DESCRIPTION | DATE | APPD. |
| | — | INITIAL RELEASE CLASS A PER TDRR 20392 | 6-15-65 | |
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|-------------|--|---|--|--|--|---|--------------|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | MIT INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| | | FRACTIONS DECIMALS ANGLES | | DWS NO. CONTRACT | | PRIMER COATING, EPOXY POLYAMIDE CHEMICAL AND SOLVENT RESISTANT | |
| | | + + + | | DRAWN <i>Bender</i> 11-JUN-65 DATE | | | |
| | | - - - | | CHECKED <i>A. C. Cymon</i> 11-JUN-65 | | | |
| | | | | APPROVAL <i>A. C. Cymon</i> 6/24/65 | | SPECIFICATION CONTROL DRAWING | |
| | | DO NOT SCALE THIS DRAWING | | APPROVAL | | | |
| | | MATERIAL | | NASA APPROVAL <i>W. J. Rye</i> 6-28-65 | | CODE IDENT NO | SIZE |
| | | | | MIT APPROVAL <i>W. J. Rye</i> | | 80230 | C |
| NEXT ASSY | | USED ON | | | | 1010992 | |
| APPLICATION | | CONTRACT NAS 9-497 | | | | SCALE | SHEET 2 of 2 |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITE GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREAT INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT HAS PROVIDED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED AS IMPLICATION OR OTHERWISE AS IT HAS GRANTED LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEY, USE, ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL, ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS

1. GENERAL:
 - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
 - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISION CONTAINED IN ND 1015404, CLASS 3.
 - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS OF ND 1002056, EXCEPT THAT THE MAXIMUM TEMPERATURE RANGE SHALL BE PER 3.C. (TO BE QUALIFIED BY USER).
 - D. PART MARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED, IN ACCORDANCE WITH ND 1002019, WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, LOT CODE OR NUMBER, TERMINAL IDENTIFICATION AND NASA PART NUMBER.
 - E. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH ND 1002215, CLASS 1, CODE 1.
 - (1) MARKING OF SHIPPING CONTAINERS SHALL CONFORM TO THE MARKING OF UNIT AND INTERMEDIATE PACKAGES AND THE METHODS OF MARKING AS SPECIFIED IN ND 1002215.

REQUIREMENTS CONTINUED ON SHEET 12

TABLE NO. 1

| DASH NO. | FIGURE | CURRENT-MAX | POWER-MAX |
|----------|--------|--------------|-----------|
| | | MILLIAMPERES | WATTS |
| 001 | 1 | 80 | 1.560 |
| 002 | 2 | 5 | .096 |
| 003 | 3 | 6 | .104 |
| 004 | 4 | 2 | .032 |
| 005 | 5 | 17 | .268 |
| 006 | 6 | 5 | .088 |
| 007 | 7 | 50 | .960 |
| 008 | 8 | 2 | .032 |
| 009 | 9 | 1 | .016 |
| 010 | 10 | 70 | 1.400 |
| | | | |
| | | | |
| | | | |

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES \pm — \pm — \pm — DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| REVISIONS | | | | | | |
|-----------|------|---|-----|-----|---------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| — | | INITIAL RELEASE CLASS A PER TDRR 23188 | | | 6-13-65 | |
| A | | REVISED PER TDRR 24978 | PKK | | 1/11/66 | WHL |
| B | | REVISED PER TDRR 25207 | RTS | | 1/18/66 | WHL |
| C | | REVISED PER TDRR 27360 | AA | | 3/24/66 | WHL |
| D | | REVISED PER TDRR 27947 | LSB | | 4/4/66 | WHL |
| E | | REVISED PER TDRR 27948 | | | 5/3/66 | WHL |
| F | | REVISED PER TDRR 27949 | | | 5/21/66 | WHL |
| G | | REVISED PER TDRR 27950 | | | 5/29/66 | WHL |
| H | | REVISED PER TDRR 29084 | | | 6/13/66 | WHL |
| J | | REVISED PER TDRR 29834 | \$ | | 7/8/66 | |

| | | | | |
|---|-------------------------|---|-----------------------------|-------------|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>andrew</i> | 20 JUL 65 | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>Johnston</i> | 2 OCT 65 | | | |
| APPROVED <i>Paul Wilson</i> | 4 OCT 65 | | | |
| APPROVED <i>J. H. Kane</i> | 10/1/65 | | | |
| APPROVED MIT <i>M. G. Munn</i> | 10/8/65 | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC | | 80230 | C | 1010999 |
| DATE | SCALE | SHEET 1 OF 13 | | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY OMISSION, WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFERRING ANY RIGHTS OR PERMISSION TO REPRODUCE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREBY.

| REVISIONS | | | | | | |
|-----------|------|--|-----|-----|----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| - | | INITIAL RELEASE CLASS A PER TDRR 23188 | | | 10-13-65 | |
| A | | REVISED PER TDRR 24978 | WJK | | 1/11/66 | WJK |
| B | | REVISED PER TDRR 25207 | WJS | | 1/18/66 | WJK |
| C | | REVISED PER TDRR 27360 | | | 3/29/66 | WJK |
| D | | REVISED PER TDRR 27947 | LFB | | 4/29/66 | WJK |
| E | | REVISED PER TDRR 27948 | | | 5/3/66 | WJK |
| F | | REVISED PER TDRR 27949 | | | 5-2-66 | WJK |
| G | | REVISED PER TDRR 27950 | | | 5-2-66 | WJK |
| H | | REVISED PER TDRR 29084 | | | 5/3/66 | WJK |
| J | | REVISED PER TDRR 29834 | | | 7/8/66 | WJK |

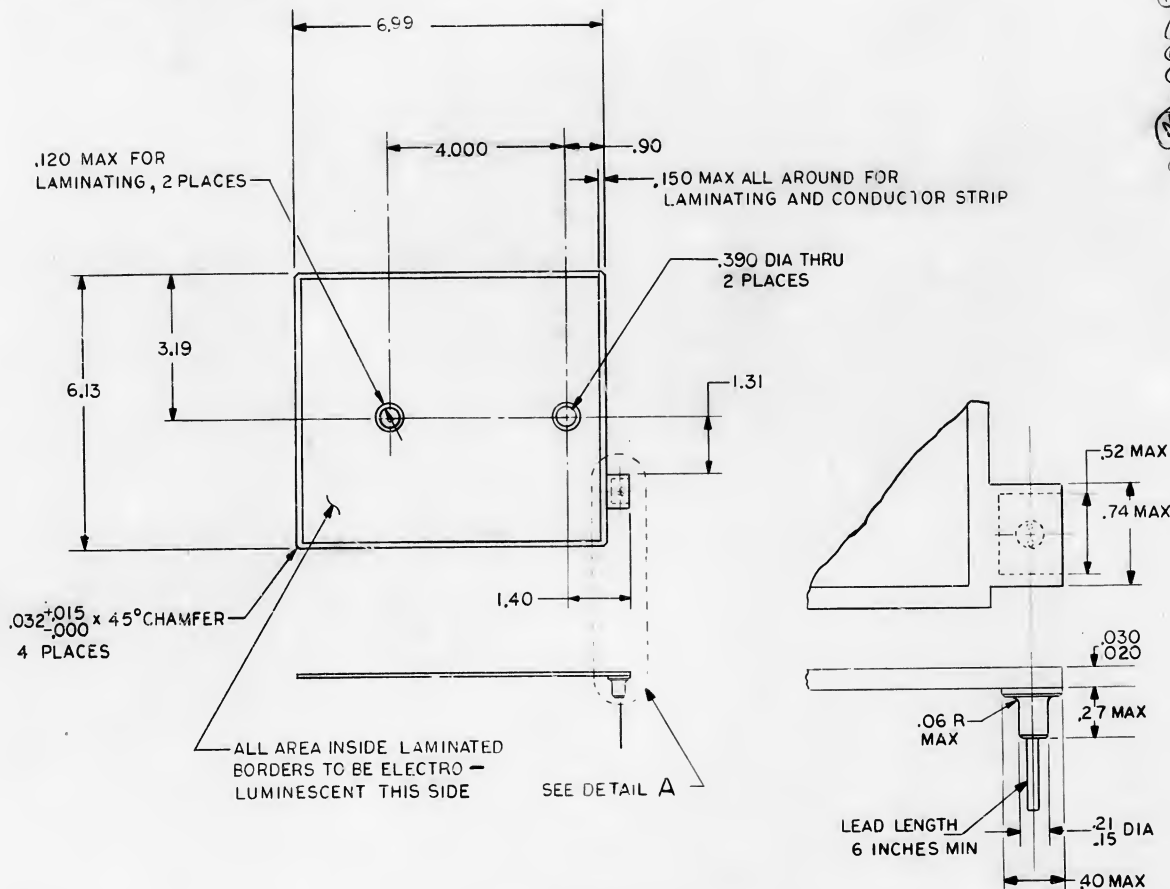


FIGURE 1

DETAIL A

| | | | | |
|---|-------------------------|---|-----------------------------|----------|
| QTY REQ | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>W. Morgan</i> 1/10/65 | | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED <i>W. Morgan</i> 2/20/65 | | | | |
| APPROVED <i>Paul Watson</i> 4/20/65 | | | | |
| APPROVED <i>W. Morgan</i> 10/13/65 | | CODE IDENT NO. 80230 | | |
| APPROVED <i>W. Morgan</i> 10/13/65 | | SIZE C | | |
| APPROVED <i>W. Morgan</i> 10/13/65 | | DRAWING NO. 1010999 | | |
| DATE | | SHEET 2 OF 13 | | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY DELAYATION, WHATEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED AS IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OF ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PRIVILEGE TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREOF.

ALL AREA INSIDE LAMINATED BORDER TO BE ELECTRO-LUMINESCENT, THIS SIDE

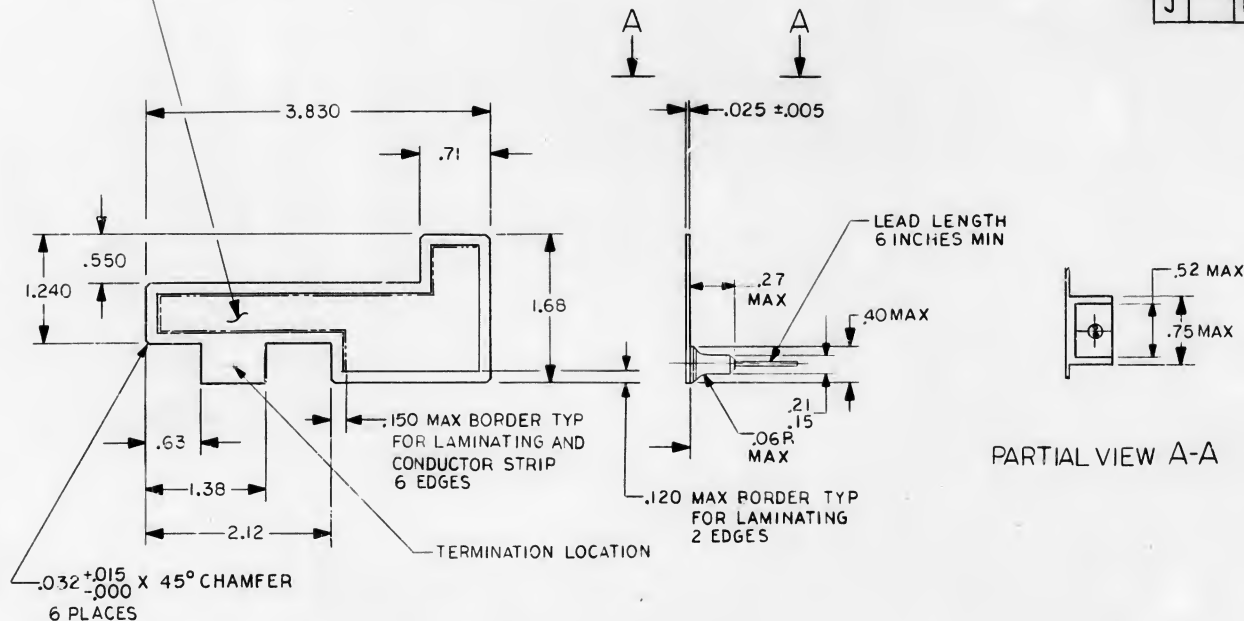


FIGURE 2

| REVISIONS | | | | | | |
|-----------|------|--|-----|-----|----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| --- | | INITIAL RELEASE CLASS A PER TDRR 23188 | | | 10-13-65 | |
| A | | REVISED PER TDRR 24978 | ATK | | 1/11/66 | WJH |
| B | | REVISED PER TDRR 25207 | ATK | | 1/18/66 | WJH |
| C | | REVISED PER TDRR 27360 | | | 3/24/66 | WJH |
| D | | REVISED PER TDRR 27947 | LTB | | 4/1/66 | WJH |
| E | | REVISED PER TDRR 27948 | | | 6/3/66 | WJH |
| F | | REVISED PER TDRR 27949 | | | 5-2-66 | WJH |
| G | | REVISED PER TDRR 27950 | | | 5-24-66 | WJH |
| H | | REVISED PER TDRR 29084 | ATK | | 6/1/66 | WJH |
| J | | REVISED PER TDRR 29834 | ATK | | 7/8/66 | WJH |

| | | | | | |
|--|-------------------------|-------------------|---|------|---------------|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | | FIND NO. |
| LIST OF MATERIALS | | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN | <i>Ed Mahoney</i> | <i>20 JULY 65</i> | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED | <i>Paul Wilson</i> | <i>2 OCT 65</i> | | | |
| APPROVED | <i>Paul Wilson</i> | <i>4 OCT 65</i> | | | |
| APPROVED | <i>J. J. K...</i> | <i>10/1/65</i> | | | |
| APPROVED MIT | <i>W. B. Mark...</i> | <i>10/15/65</i> | CODE IDENT NO. | SIZE | DRAWING NO. |
| NOT REQUIRED FOR MIT | | | 80230 | C | 1010999 |
| APPROVED MSC | <i>65-612</i> | DATE | SCALE | | SHEET 3 OF 18 |

| | |
|--|---------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .015$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING | |
| MATERIAL | |
| SEE NOTES | |
| NEXT ASSY | USED ON |
| APPLICATION | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT HEREBY INCURS NO RESPONSIBILITY FOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED AS IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSE THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEY ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREIN.

.025

.150 MAX BORDER
FOR LAMINATING AND
CONDUCTOR STRIP

.27
MAX
21 DIA
.15
.40 MAX
.06 R
MAX

LEAD LENGTH
6 INCHES MIN.

1.13
.50 MAX

.52
MAX
.75
MAX
.25

1.25

1.63 REF

.032⁺⁰¹⁵_{-.000} x 45° CHAMFER
4 PLACES

ALL AREA INSIDE
LAMINATED BORDER TO BE
ELECTRO-LUMINESCENT
THIS SIDE

| REVISIONS | | | | | |
|-----------|------|---|-----|-----|---------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE |
| | | INITIAL RELEASE CLASS A PER TDRR 23188 | | | |
| A | | REVISED PER TDRR 24978 | PPK | | 1/11/66 |
| B | | REVISED PER TDRR 25207 | RR | | 1/19/66 |
| C | | REVISED PER TDRR 27360 | | | 3/24/66 |
| D | | REVISED PER TDRR 27947 | LTB | | 4/10/66 |
| E | | REVISED PER TDRR 27948 | | | 5/10/66 |
| F | | REVISED PER TDRR 27949 | | | 5-10-66 |
| G | | REVISED PER TDRR 27950 | | | 5-24-66 |
| H | | REVISED PER TDRR 29084 | | | 6/3/66 |
| J | | REVISED PER TDRR 29834 | | | 7/6/66 |

FIGURE 4

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ I RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | |
| | | |
| | | |
| | | |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| | | | | |
|---|----------------------------|---|--------------------------------|-------------|
| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN | 204/65 | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED | 204/65 | | | |
| APPROVED | 204/65 | | | |
| APPROVED | 204/65 | | | |
| APPROVED MIT | 204/65 | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC | 204/65 | 80230 | C | 1010999 |
| DATE | SCALE | SHEET 5 OF 13 | | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT HEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA, NOT TO BE REGARDED AS IMPLICATION OR OTHERWISE, AS IN ANY MANNER, LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREBY.

| REVISIONS | | | | | | |
|-----------|------|---------------------------------------|-----|-----|---------|----------|
| SYN | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| - | | INITIAL RELEASE CLASS A PER TDRR 3188 | | | 10-9-65 | |
| A | | REVISED PER TDRR 24978 | EPK | | 1/11/66 | WHL |
| B | | REVISED PER TDRR 25207 | EPK | | 1/18/66 | WHL |
| C | | REVISED PER TDRR 27360 | | | 3/29/66 | WHL |
| D | | REVISED PER TDRR 27947 | LFB | | 4/20/66 | WHL |
| E | | REVISED PER TDRR 27948 | | | 5/3/66 | WHL |
| F | | REVISED PER TDRR 27949 | | | 5/10/66 | WHL |
| G | | REVISED PER TDRR 27950 | | | 5/24/66 | WHL |
| H | | REVISED PER TDRR 29084 | | | 6/9/66 | WHL |
| J | | REVISED PER TDRR 29834 | | | 7/6/66 | WHL |

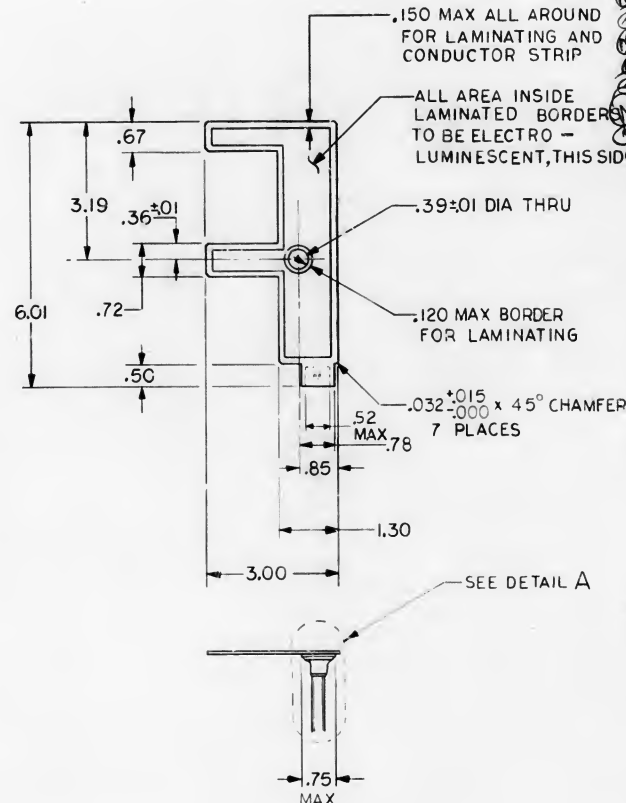


FIGURE 5

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|---|-------------------------|--|-----------------------------|---------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN <i>W. Horgan</i> 12/20/65 | | LAMP | | |
| CHECKED <i>J. Horgan</i> 12/20/65 | | ELECTRO - LUMINESCENT | | |
| APPROVED <i>Paul Watson</i> 10/27/65 | | SPECIFICATION CONTROL DRAWING | | |
| APPROVED <i>J. Horgan</i> 10/17/65 | | DRAWING NO. 1010999 | | |
| APPROVED <i>W. Horgan</i> 10/15/65 | | CODE IDENT NO. 80230 | SIZE C | |
| NOT REQUIRED FOR CENTER | | DATE | SCALE | SHEET 6 OF 13 |

| | |
|--|---------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING | |
| MATERIAL | |
| SEE NOTES | |
| NEXT ASSY | USED ON |
| APPLICATION | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY; NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSES THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFIRMS ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

| REVISIONS | | | | | | |
|-----------|------|---|-----|-----|---------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| | | INITIAL RELEASE CLASS A PER TDRR 23188 | | | 10/1/65 | |
| (W) | A | REVISED PER TDRR 24978 | WPK | | 1/11/66 | WPK |
| (W) | E | REVISED PER TDRR 25207 | WPK | | 1/11/66 | WPK |
| (W) | C | REVISED PER TDRR 27360 | | | 3/25/66 | WPK |
| (W) | D | REVISED PER TDRR 27947 | LTB | | 4/10/66 | WPK |
| (W) | E | REVISED PER TDRR 27948 | | | 5/9/66 | WPK |
| (W) | F | REVISED PER TDRR 27749 | | | 5/20/66 | WPK |
| (W) | B | REVISED PER TDRR 27950 | | | 5/24/66 | WPK |
| (W) | H | REVISED PER TDRR 29084 | | | 6/1/66 | WPK |
| (W) | J | REVISED PER TDRR 29834 | \$ | | 7/8/66 | WPK |

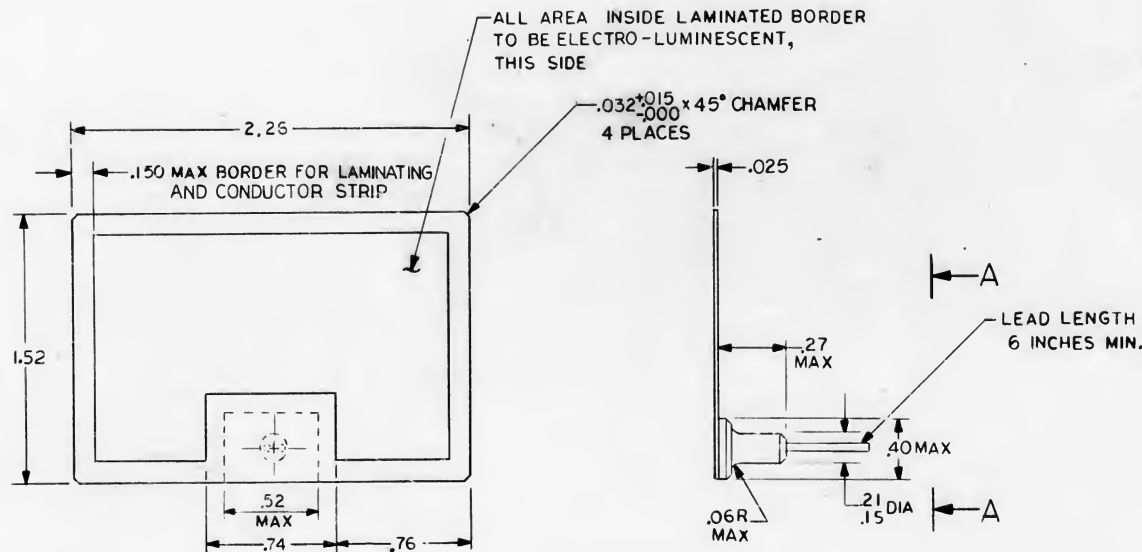


FIGURE 6

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|--|-------------------------|--|---|---------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN | <i>D. Bell</i> | 10-2-65 | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | |
| CHECKED | <i>J. Schmitt</i> | 10-15-65 | | |
| APPROVED | <i>Paul Watson</i> | 10-15-65 | | |
| APPROVED | <i>J. Schmitt</i> | 10-15-65 | | |
| APPROVED | <i>W. W. W. W.</i> | 10-15-65 | CODE IDENT NO. SIZE | DRAWING NO. |
| MIT | | | 80230 C | 1010999 |
| APPROVED | <i>G. W. W.</i> | | DATE | SHEET 7 OF 13 |

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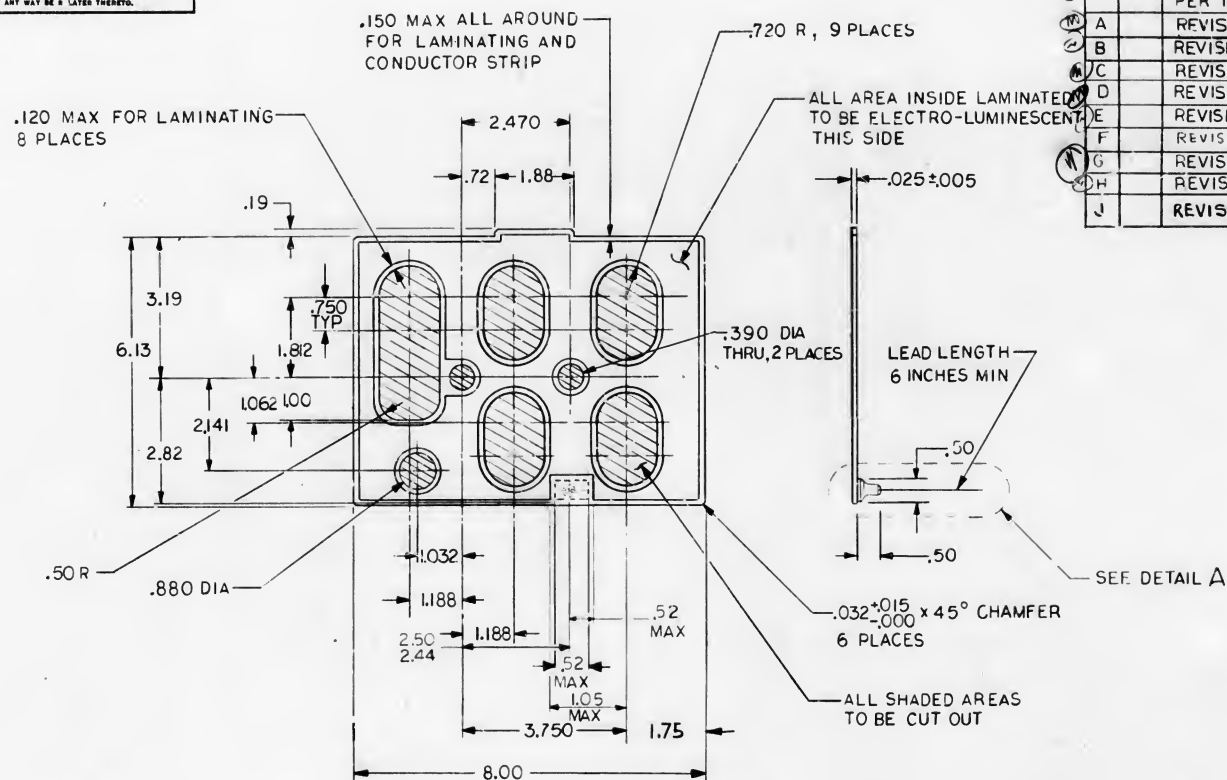
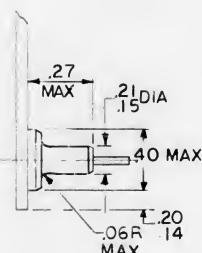


FIGURE 7



DETAIL A

| | |
|--|------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES | |
| TOLERANCES ON | |
| 2 PLG DEC. | 3 PLG DEC. |
| ±.02 | ±.010 ± 5° |
| DO NOT SCALE THIS DRAWING | |
| MATERIAL | |
| SEE NOTES | |
| NEXT ASSY | USED ON |
| APPLICATION | |

| REVISIONS | | | | | | |
|-----------|------|-------------------------------------|-----|-----|----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| - | | INITIAL RELEASE CLASS A PER TDRR | | | 10-15-65 | |
| A | | REVISED PER TDRR 24978 | EPK | | 11/11/66 | WKC |
| B | | REVISED PER TDRR 25207 | RTS | | 1/15/66 | WKC |
| C | | REVISED PER TDRR 27360 | | | 3/19/66 | WKC |
| D | | REVISED PER TDRR 27947 | LAB | | 4/14/66 | WKC |
| E | | REVISED PER TDRR 27948 | | | 5/3/66 | WKC |
| F | | REVISED PER TDRR 27949 | | | 5/10/66 | WKC |
| G | | REVISED PER TDRR 27350 | | | 5/24/66 | WKC |
| H | | REVISED PER TDRR 29084 | | | 6/1/66 | WKC |
| J | | REVISED PER TDRR 29834 | | | 7/8/66 | WKC |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | | FIND NO. |
|--|----------------------------|--|--------------------------------|---------------|-------------|
| LIST OF MATERIALS | | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | | |
| DRAWN <i>W. Morgan</i> 10/10/65 | | LAMP | | | |
| CHECKED <i>J. Morgan</i> 2/20/66 | | ELECTRO-LUMINESCENT | | | |
| APPROVED <i>Paul Watson</i> 9/21/65 | | SPECIFICATION CONTROL DRAWING | | | |
| APPROVED <i>J. Morgan</i> 10/15/65 | | | | | |
| APPROVED MIT <i>W. Morgan</i> 10/15/65 | | CODE IDENT NO. | SIZE | DRAWING NO. | |
| APPROVED MSC <i>W. Morgan</i> 10/15/65 | | 80230 | C | 1010999 | |
| DATE | | SCALE | | SHEET 8 OF 13 | |

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| REVISIONS | | | | | | |
|-----------|------|---|-----|-----|---------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| | | INITIAL RELEASE CLASS A PER TDRR 23182 | | | 11/1/65 | |
| A | | REVISED PER TDRR 24978 | RPS | | 1/11/66 | WLC |
| B | | REVISED PER TDRR 25207 | RPS | | 1/18/66 | WLC |
| C | | REVISED PER TDRR 27360 | | | 2/24/66 | WLC |
| D | | REVISED PER TDRR 27947 | LSB | | 2/10/66 | WLC |
| E | | REVISED PER TDRR 27948 | | | 5/3/66 | WLC |
| F | | REVISED PER TDRR 27949 | | | 5/10/66 | WLC |
| G | | REVISED PER TDRR 27950 | | | 5/24/66 | WLC |
| H | | REVISED PER TDRR 29084 | | | 6/3/66 | WLC |
| J | | REVISED PER TDRR 29834 | | | 7/6/66 | WLC |

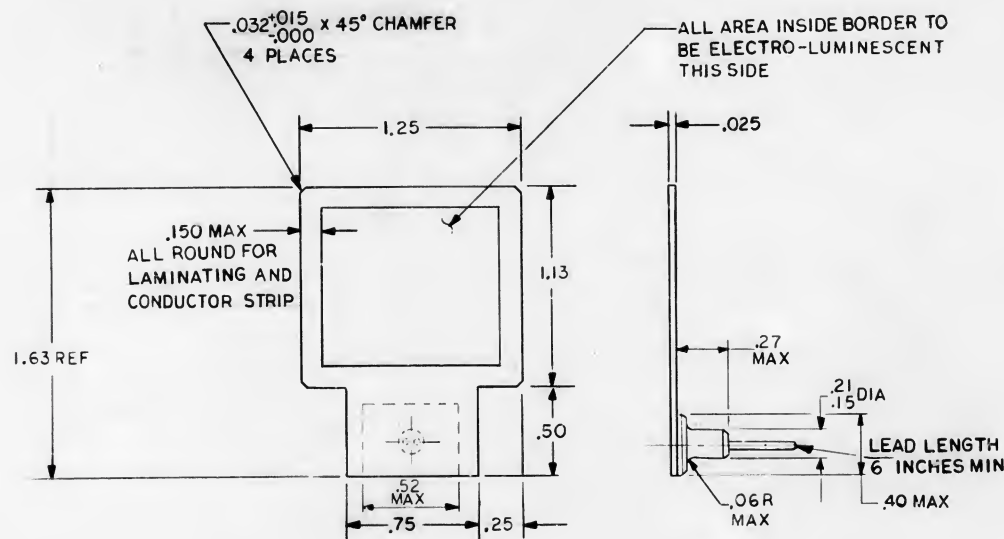


FIGURE 8

| | | |
|-------------|---------|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ f RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING |
| | | |
| | | |
| | | |
| | | |
| | | MATERIAL |
| | | SEE NOTES |
| NEXT ASSY | USED ON | |
| APPLICATION | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. | |
|--|-------------------------|--|--|----------|-------------|
| LIST OF MATERIALS | | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | | |
| DRAWN | <i>Lewis A. Lewis</i> | <i>2/15/66</i> | LAMP | | |
| CHECKED | <i>John W. Wilson</i> | <i>2/22/66</i> | ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| APPROVED | <i>Paul Wilson</i> | <i>4/25/66</i> | | | |
| APPROVED | <i>John W. Wilson</i> | <i>4/21/66</i> | | | |
| APPROVED MIT | <i>W. H. Wilson</i> | <i>1/13/65</i> | CODE IDENT NO. | SIZE | DRAWING NO. |
| APPROVED MSC | <i>7-55-612</i> | DATE | 80230 | C | 1010999 |
| | | SCALE | SHEET 9 OF 13 | | |

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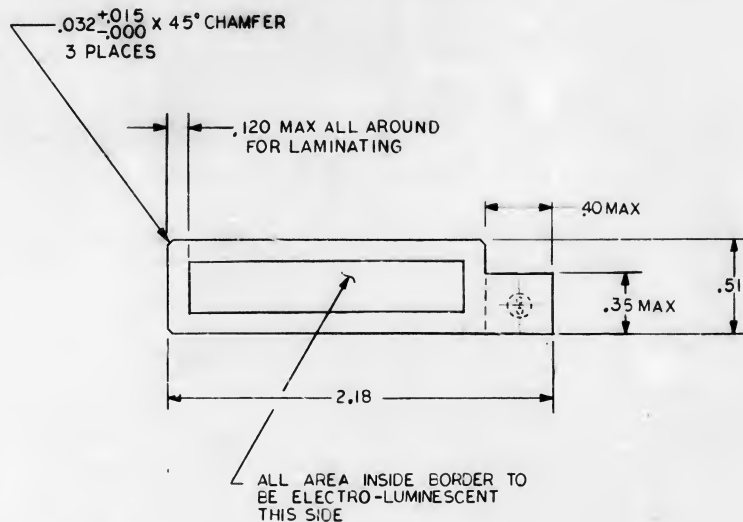
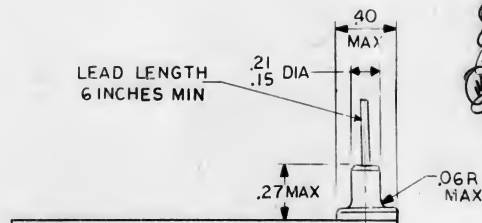


FIGURE 9

| REVISIONS | | | | | | |
|-----------|------|--|-----|-----|----------|----------|
| SYM | ZONE | DESCRIPTION | DR | CHK | DATE | APPROVED |
| -- | | INITIAL RELEASE CLASS A PER TDRR 23188 | | | 10-18-65 | |
| (A) | A | REVISED PER TDRR 24978 | RPK | | 1/11/66 | WLC |
| (B) | B | REVISED PER TDRR 25207 | RTS | | 1/18/66 | WLC |
| (C) | C | REVISED PER TDRR 27360 | | | 3/25/66 | WLC |
| (D) | D | REVISED PER TDRR 27947 | LIG | | 1/20/66 | WLC |
| (E) | E | REVISED PER TDRR 27948 | | | 3/2/66 | WLC |
| (F) | F | REVISED PER TDRR 27949 | | | 5/10/66 | WLC |
| (G) | G | REVISED PER TDRR 27950 | | | 5/24/66 | WLC |
| (H) | H | REVISED PER TDRR 29084 | | | 6/13/66 | WLC |
| (J) | J | REVISED PER TDRR 29834 | \$ | | 7/8/66 | WLC |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | | FIND NO. |
|--|-------------------------|-------------------|---|----------------|-------------|
| LIST OF MATERIALS | | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN | <i>Louis A. Lore</i> | <i>2/15/66</i> | LAMP, ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | | |
| CHECKED | <i>John J. Lore</i> | <i>2/20/66</i> | | | |
| APPROVED | <i>John J. Lore</i> | <i>4/27/66</i> | | | |
| APPROVED | <i>John J. Lore</i> | <i>10/1/66</i> | | | |
| APPROVED MIT | <i>W. J. Moore</i> | <i>10/1/66</i> | CODE IDENT NO. | SIZE | DRAWING NO. |
| NOT REQUIRED FOR MIT | | | 80230 | C | 1010999 |
| APPROVED MSC | MIT 77-65-612 | DATE | SCALE | SHEET 10 OF 13 | |

| | |
|--|---------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC 3 PLC DEC ANGLES $\pm .02$ $\pm .005$ $\pm 5^\circ$ DO NOT SCALE THIS DRAWING | |
| MATERIAL | |
| SEE NOTES | |
| NEXT ASSY | USED ON |
| APPLICATION | |

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A SPECIFICALLY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY INADEQUACY, MISSTATEMENT, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL, ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

| REVISIONS | | | | | | |
|-----------|------|---|-----|-----|----------|----------|
| SYM | ZONE | DESCRIPTION | DY | CHK | DATE | APPROVED |
| | | INITIAL RELEASE CLASS A PER TDRR 23188 | | | 10-15-65 | |
| (U) | A | REVISED PER TDRR 24978 | EPK | | 11/11/65 | WLC |
| (U) | B | REVISED PER TDRR 25207 | RTT | | 1/8/66 | WLC |
| (U) | C | REVISED PER TDRR 27360 | | | 3/24/66 | WLC |
| (U) | D | REVISED PER TDRR 27947 | LTB | | 4/20/66 | WLC |
| (U) | E | REVISED PER TDRR 27946 | | | 5/3/66 | WLC |
| (U) | F | REVISED PER TDRR 27949 | | | 5/18/66 | WLC |
| (U) | G | REVISED PER TDRR 27950 | | | 5-26-66 | WLC |
| (U) | H | REVISED PER TDRR 29084 | | | 6/1/66 | WLC |
| (U) | J | REVISED PER TDRR 29084 | | | 7/6/66 | WLC |

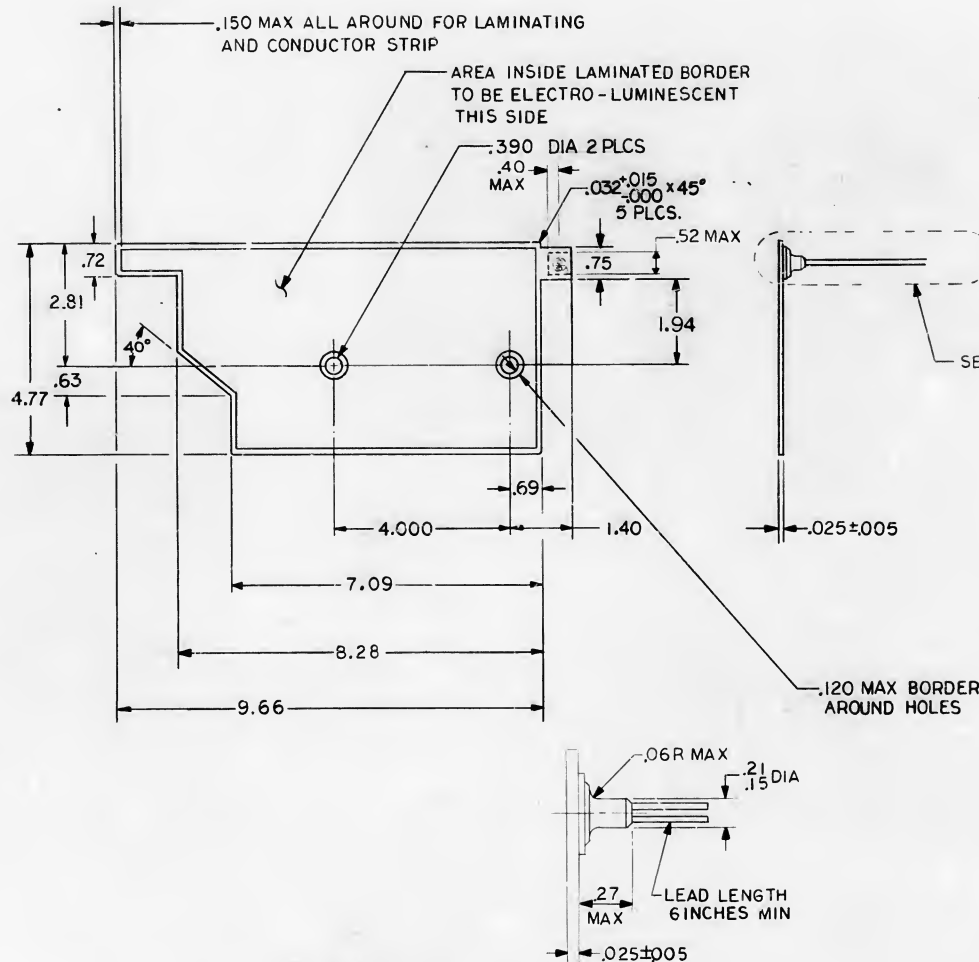


FIGURE 10

DETAIL A

| | | | |
|-------------|---------|--|--|
| | | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μ F RESISTOR VALUES ARE IN OHMS TOLERANCES ON 2 PLC DEC. 3 PLC DEC. ANGLES $\pm .02$ $\pm .010$ $\pm 2^\circ$ DO NOT SCALE THIS DRAWING | |
| | | MATERIAL | |
| | | SEE NOTES | |
| NEXT ASSY | USED ON | | |
| APPLICATION | | | |

| QTY REQD | PART OR IDENTIFYING NO. | MATERIAL OR NOTES | NOMENCLATURE OR DESCRIPTION | FIND NO. |
|--|-------------------------|--|--|----------------|
| LIST OF MATERIALS | | | | |
| MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DRAWN | W. Morgan | 10/15/65 | LAMP ELECTRO-LUMINESCENT SPECIFICATION CONTROL DRAWING | |
| CHECKED | J. Morgan | 2/25/65 | | |
| APPROVED | Paul Watson | 4/20/65 | | |
| APPROVED | J. Morgan | 10/15/65 | | |
| APPROVED MIT | W. Morgan | 10-15-65 | CODE IDENT NO. | SIZE |
| APPROVED MSC | 10-15-65 | 10-15-65 | 80230 | C |
| | | DATE | SCALE | DRAWING NO. |
| | | | | 1010999 |
| | | | | SHEET 11 OF 13 |

| REVISIONS | | | | |
|-----------|-----|---------------------------------|----------|--------------------|
| ZONE | LTR | DESCRIPTION | DATE | APPROVED |
| | J | THIS SHEET ADDED PER TDRR 29834 | 8 JUL 66 | <i>[Signature]</i> |

REQUIREMENTS: (CONTINUED)

2. ACCEPTANCE AND INSPECTION (100%):

A. MECHANICAL PROPERTIES:

- (1) DIMENSION: SHALL BE AS SHOWN PER TABLE NO. 1.
- (2) LEAD STRENGTH: LEADS SHALL BE CAPABLE OF WITHSTANDING A 2 POUND AXIAL PULL.
- (3) LEAD MATERIAL: SHALL BE PER MIL-W-16878 (TYPE E-26). THE LEAD CONNECTED TO THE ELECTRO-LUMINESCENT SIDE SHALL HAVE LIGHT BROWN INSULATION AND THE LEAD CONNECTED TO THE REVERSE SIDE SHALL HAVE BLACK INSULATION. THE COLORS SHALL BE EASILY DISCERNIBLE.

B. ELECTRICAL AND PHOTOMETRIC PROPERTIES:

- (1) TRANSIENT VOLTAGE: THE LAMP SHALL BE EXCITED WITH 160 ± 5 VOLTS RMS 400 CPS, FOR 5 SECONDS MINIMUM. AFTER APPLICATION OF THIS VOLTAGE THE LAMP MUST BE CAPABLE OF MEETING THE OTHER REQUIREMENTS OF SECTION B.
- (2) LIGHT INTENSITY: 1.2 TO 2.0 FOOT-LAMBERTS INITIALLY WHEN EXCITED WITH 75 ± 1.0 VOLTS RMS, 400 \pm 10 CPS.
- (3) CURRENT: PER TABLE NO. 1, WHEN EXCITED PER 2.B.(2).
- (4) POWER: PER TABLE NO. 1, WHEN EXCITED PER 2.B.(2).
- (5) LIGHT OUTPUT COLOR: THE LIGHT OUTPUT COLOR SHALL BE AS SPECIFIED IN 3.F.(1). AS DETERMINED BY MEASUREMENT OF A REPRESENTATIVE SAMPLE OF EACH PRODUCTION RUN AND VISUAL COMPARISON OF THE LAMPS WITH THE SAMPLE.
- (6) DC INSULATION RESISTANCE: THE LEADS OF THE LAMP SHALL BE CONNECTED TOGETHER AND THE LAMP IMMERSED IN A 1% SOLUTION OF SALT WATER. THE DC RESISTANCE MEASURED BETWEEN THE LEADS AND THE WATER SHALL NOT BE LESS THAN 10 MEGOHMS.

3. DESIGN REQUIREMENTS

- A. OPERATING LIFE: 2000 HOURS MINIMUM AT 25°C WITH A LOSS OF NOT MORE THAN 90% OF ORIGINAL LIGHT INTENSITY. MEASUREMENTS ACCOMPLISHED WHEN EXCITED PER 2.B.(2) AT 25°C.

- B. STORAGE LIFE: 1 YEAR MINIMUM WITHOUT LOSS OF ELECTRICAL PERFORMANCE AT 0° TO +65°C.

- C. OPERATING TEMPERATURE RANGE: -55°C TO +65°C. ACCELERATED LIFE DEGRADATION IS NOTED WITH OPERATION ABOVE 25°C.

- D. SEAL DESIGN OBJECTIVE: THE LAMPS SHALL BE SUBJECTED TO THE IMMERSION TEST (CONDITION B) SPECIFIED IN MIL-STD-202C. THE LIGHT INTENSITY OF PARAGRAPH 2.B.(2) AND THE DC INSULATION RESISTANCE OF PARAGRAPH 2.B.(6) SHALL BE CHECKED AFTER THE IMMERSION AS ACCEPTANCE CRITERIA.

E. MATERIAL:

- (1) ACLAR ENCAPSULATED ELECTRO-LUMINESCENT LAMP.
- (2) THE LEAD INSULATION SHALL BE CHEMICALLY TREATED IN A MANNER TO ALLOW ADHESIVE BONDING OR POTTING AND ALLOW THE UNIT TO MEET THE IMMERSION TEST REQUIREMENT OF 3.D.

F. RATING:

- (1) LIGHT OUTPUT COLOR: $X = 0.33 \pm 0.02$, $Y = 0.33 \pm 0.02$ PER CIE DIAGRAM.
- (2) MAX. CONTINUOUS VOLTAGE: 120 V RMS 400 CPS.
- (3) UNIFORMITY OF LIGHT INTENSITY: THE LIGHT INTENSITY SHALL BE UNIFORM OVER THE FACE OF THE LAMP WITHIN 10%.
- (4) UNIFORMITY OF LIGHT OUTPUT COLOR: THE LIGHT OUTPUT COLOR SHALL BE UNIFORM OVER THE FACE OF THE LAMP WITHIN THE TOLERANCE SPECIFIED IN 3.F.(1).

| | | | | | |
|---|---------------------|--|------------------------------------|---|-------------------------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | MIT INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| 2 PLACE DECIMALS | 3 PLACE DECIMALS | ANGLES | DRAWN <i>[Signature]</i> | DATE 15 JUL 66 | LAMP ELECTRO-LUMINESCENT |
| + | + | + | CHECKED <i>[Signature]</i> | 15 JUL 66 | |
| - | - | - | APPROVAL <i>[Signature]</i> | 15 JUL 66 | |
| DO NOT SCALE THIS DRAWING | | | CONTRACT | | SPECIFICATION CONTROL DRAWING |
| MATERIAL | | | NASA APPROVAL | | |
| APPROVAL | | | MIT APPROVAL <i>[Signature]</i> | | SIZE C |
| | | | | | CODE IDENT NO. 80230 |
| | | | | | 1010999 |
| | | | SCALE | | SHEET 12 of 13 |

| REVISIONS | | | |
|-----------|-----|---------------------------------|----------|
| ZONE | LTR | DESCRIPTION | DATE |
| | J | THIS SHEET ADDED PER TORR 29834 | 8 JUL 66 |
| | | | APPROVED |

REQUIREMENTS: (CONTINUED)

4. SPECIAL CONDITIONING BY MANUFACTURER:

- A. ALL LAMPS SHALL BE BURNED-IN FOR A PERIOD OF 50 TO 100 HOURS PRIOR TO THE ACCEPTANCE AND INSPECTION TESTS IN 2.B. ABOVE. THE BURN-IN CONDITIONS SHALL BE AS FOLLOWS:
- (1) TEMPERATURE: $25 \pm 5^\circ\text{C}$.
 - (2) OPERATING VOLTAGE: 115 ± 10 V RMS, 60 ± 5 CPS FOR THE FIRST 50 HRS., AND 120 V RMS, 400 ± 10 CPS FOR REMAINDER OF BURN-IN.

| | | | | | |
|---|---------------------|--|---|---|--|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | MIT INSTRUMENTATION LAB CAMBRIDGE MASS | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| 2 PLACE DECIMALS | 3 PLACE DECIMALS | ANGLES | DATE | LAMP, ELECTRO-LUMINESCENT | |
| + | + | + | 15 JUL 66 | SPECIFICATION CONTROL DRAWING | |
| - | - | - | CHECKED <i>[Signature]</i> 15 JUL 66 | SIZE C | |
| DO NOT SCALE THIS DRAWING | | | APPROVAL <i>Paul W. [Signature]</i> 15 JUL 66 | CODE IDENT NO. 80230 | |
| MATERIAL | | | CONTRACT <i>[Signature]</i> 8/15/66 | 1010999 | |
| APPROVAL | | | NASA APPROVAL | SHEET 13 of 13 | |
| | | | MIT APPROVAL <i>[Signature]</i> 8-16-66 | SCALE — | |

2014150B

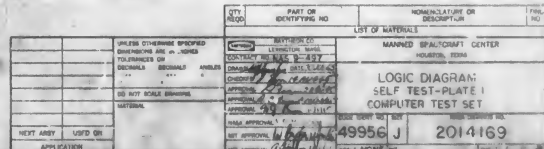
| SIGNAL | FROM | TO | FROM | TO | FROM | TO |
|--------|----------|----------|----------|----------|----------|----------|
| RA10 | A1-12-12 | A1-42-02 | A1-42-02 | A2-31-08 | A2-31-08 | A2-42-02 |
| RA11 | A1-14-10 | A1-43-11 | A1-43-11 | A2-30-07 | A2-30-07 | A2-41-13 |
| RA12 | A1-15-10 | A1-41-19 | A2-01-19 | A2-29-06 | A2-29-06 | A2-42-03 |
| RA13 | A1-32-01 | A2-01-09 | A2-01-09 | A2-30-04 | | |
| RA14 | A1-33-04 | A2-03-19 | A2-03-19 | A2-28-19 | | |
| RA15 | A1-10-16 | A2-30-09 | | | | |
| RA16 | A1-08-18 | A2-01-08 | A2-25-14 | | | |
| RA2 | A1-13-05 | A2-02-18 | A2-02-18 | A2-28-13 | A2-28-13 | |
| RA3 | A1-14-05 | A2-02-08 | A2-02-08 | A2-30-16 | A2-30-16 | A2-45-13 |
| RA4 | A1-11-12 | A2-03-18 | A2-03-18 | A2-34-06 | A2-34-06 | A2-46-14 |
| RA5 | A1-10-19 | A2-03-08 | A2-03-08 | A2-32-19 | A2-32-19 | A2-42-11 |
| RA6 | A1-12-15 | A1-44-05 | A2-32-09 | A2-32-09 | A2-32-09 | A2-44-06 |
| RA7 | A1-12-12 | A2-02-12 | A2-33-19 | A2-33-19 | A2-33-19 | A2-42-17 |
| RA8 | A1-11-14 | A2-04-19 | A2-04-19 | A2-33-09 | A2-33-09 | A2-45-19 |
| RA9 | A1-12-14 | A1-45-05 | A1-45-05 | A2-31-18 | A2-31-18 | A2-40-15 |
| RB1 | A1-12-04 | A2-44-05 | | | | |
| RB10 | A1-10-03 | A2-40-11 | | | | |
| RB11 | A1-11-13 | A2-41-03 | | | | |
| RB2 | A1-11-03 | A2-40-14 | | | | |
| RB3 | A1-14-07 | A2-27-04 | | | | |
| RB4 | A1-13-07 | A2-29-10 | | | | |
| RB5 | A1-10-02 | A2-25-15 | | | | |
| RB6 | A1-13-18 | A2-03-09 | A2-03-09 | A2-27-05 | | |
| RB7 | A1-07-02 | A2-44-03 | | | | |
| RB8 | A1-05-12 | A2-45-03 | | | | |
| RB9 | A1-08-02 | A2-44-04 | | | | |
| RB10 | A1-26-08 | A2-42-01 | | | | |
| RB11 | A1-09-12 | A2-45-16 | | | | |
| RB12 | A1-13-08 | A2-43-07 | | | | |
| RB13 | A1-08-11 | A2-43-07 | | | | |
| RB14 | A1-09-02 | A2-40-05 | | | | |
| RB15 | A1-23-12 | A2-20-16 | | | | |
| RB16 | A2-05-18 | A2-28-12 | | | | |
| RB17 | A1-24-18 | A2-21-11 | A2-21-11 | A2-24-11 | | |
| RB18 | A1-09-04 | A2-18-02 | | | | |
| RB19 | A1-31-07 | A2-41-02 | A1-37-12 | A2-38-12 | | |
| RB20 | A1-33-13 | A1-37-08 | A1-37-08 | A1-43-04 | | |
| RB21 | A1-31-03 | A1-42-08 | A1-42-08 | A2-39-11 | | |
| RB22 | A1-33-03 | A1-40-17 | A1-40-17 | A1-44-05 | | |
| RB23 | A1-13-12 | A1-41-17 | A1-41-17 | A1-45-03 | | |
| RB24 | A1-32-18 | A1-40-01 | A1-40-01 | A2-39-01 | | |
| RB25 | A1-31-02 | A1-41-07 | A1-41-07 | A2-40-19 | | |
| RB26 | A1-32-02 | A1-42-17 | A1-42-17 | A1-45-19 | | |
| RB27 | A1-11-05 | A1-40-16 | A1-40-16 | A1-45-09 | | |
| RB28 | A1-13-12 | A1-42-07 | A1-42-07 | A2-40-09 | | |
| RB29 | A1-13-05 | A1-41-16 | A1-41-16 | A1-45-18 | | |
| RB30 | A1-08-03 | A1-41-06 | A1-41-06 | A2-41-09 | | |
| RB31 | A1-13-14 | A1-42-16 | | | | |
| RB32 | A1-09-04 | A1-42-06 | A1-42-06 | A2-01-15 | A2-01-15 | A2-42-19 |
| RB33 | A1-10-08 | A1-40-15 | A1-40-15 | A1-43-08 | | |
| RB34 | A1-13-12 | A1-39-12 | A2-18-02 | | | |
| RB35 | A1-31-11 | A1-38-02 | A1-38-02 | A1-44-18 | | |
| RB36 | A1-31-01 | A1-39-12 | A1-39-12 | A2-43-15 | | |
| RB37 | A1-32-01 | A1-39-02 | A1-39-02 | A1-40-08 | | |
| RB38 | A1-32-01 | A1-37-11 | A1-37-11 | A2-39-12 | | |
| RB39 | A1-33-07 | A1-40-19 | A1-40-19 | A1-45-18 | | |
| RB40 | A1-13-14 | A1-40-09 | A2-39-02 | | | |
| RB41 | A1-14-04 | A1-41-19 | A1-41-19 | A1-45-08 | | |
| RB42 | A1-14-14 | A1-41-09 | A1-41-09 | A2-37-11 | | |
| RB43 | A1-13-04 | A1-42-19 | A1-42-19 | A1-43-17 | | |
| RB44 | A1-33-16 | A1-41-09 | A1-42-09 | A2-37-01 | | |
| RB45 | A1-25-16 | A1-40-12 | A1-41-18 | A2-03-14 | | |
| RB46 | A1-33-06 | A1-40-02 | A1-40-02 | A2-38-11 | | |
| RB47 | A1-31-15 | A1-41-18 | A1-41-18 | A1-44-17 | | |
| RB48 | A1-31-05 | A1-41-08 | A1-41-08 | A2-38-01 | | |
| RB49 | A1-32-15 | A1-42-18 | A1-42-18 | A1-45-17 | | |
| RLP1 | A1-32-05 | A2-44-19 | | | | |
| RLP2 | A1-33-15 | A2-42-12 | | | | |
| RLP3 | A1-31-04 | A2-41-12 | | | | |
| RLP4 | A1-29-11 | A2-40-03 | | | | |
| RLP5 | A1-14-16 | A2-25-04 | | | | |
| RLP6 | A1-13-08 | A2-28-09 | | | | |
| RLP7 | A1-14-06 | A2-30-08 | | | | |
| RLP8 | A1-12-09 | A2-27-13 | A1-45-13 | A2-25-03 | | |
| RLP9 | A1-29-01 | A2-45-02 | | | | |
| RLP10 | A1-30-01 | A2-45-12 | | | | |
| RLP11 | A1-31-09 | A2-44-03 | | | | |
| RLP12 | A1-27-10 | A2-44-08 | | | | |
| RLP13 | A1-33-09 | A2-44-16 | | | | |
| RLP14 | A1-31-08 | A2-43-16 | | | | |
| RLP15 | A1-31-08 | A2-45-09 | | | | |
| RLP16 | A1-31-08 | A2-45-09 | | | | |
| RLP17 | A1-31-08 | A2-45-09 | | | | |
| RLP18 | A1-31-08 | A2-45-09 | | | | |
| RLP19 | A1-31-08 | A2-45-09 | | | | |
| RLP20 | A1-31-08 | A2-45-09 | | | | |
| RLP21 | A1-31-08 | A2-45-09 | | | | |
| RLP22 | A1-31-08 | A2-45-09 | | | | |
| RLP23 | A1-31-08 | A2-45-09 | | | | |
| RLP24 | A1-31-08 | A2-45-09 | | | | |
| RLP25 | A1-31-08 | A2-45-09 | | | | |
| RLP26 | A1-31-08 | A2-45-09 | | | | |
| RLP27 | A1-31-08 | A2-45-09 | | | | |
| RLP28 | A1-31-08 | A2-45-09 | | | | |
| RLP29 | A1-31-08 | A2-45-09 | | | | |
| RLP30 | A1-31-08 | A2-45-09 | | | | |
| RLP31 | A1-31-08 | A2-45-09 | | | | |
| RLP32 | A1-31-08 | A2-45-09 | | | | |
| RLP33 | A1-31-08 | A2-45-09 | | | | |
| RLP34 | A1-31-08 | A2-45-09 | | | | |
| RLP35 | A1-31-08 | A2-45-09 | | | | |
| RLP36 | A1-31-08 | A2-45-09 | | | | |
| RLP37 | A1-31-08 | A2-45-09 | | | | |
| RLP38 | A1-31-08 | A2-45-09 | | | | |
| RLP39 | A1-31-08 | A2-45-09 | | | | |
| RLP40 | A1-31-08 | A2-45-09 | | | | |
| RLP41 | A1-31-08 | A2-45-09 | | | | |
| RLP42 | A1-31-08 | A2-45-09 | | | | |
| RLP43 | A1-31-08 | A2-45-09 | | | | |
| RLP44 | A1-31-08 | A2-45-09 | | | | |
| RLP45 | A1-31-08 | A2-45-09 | | | | |
| RLP46 | A1-31-08 | A2-45-09 | | | | |
| RLP47 | A1-31-08 | A2-45-09 | | | | |
| RLP48 | A1-31-08 | A2-45-09 | | | | |
| RLP49 | A1-31-08 | A2-45-09 | | | | |
| RLP50 | A1-31-08 | A2-45-09 | | | | |
| RLP51 | A1-31-08 | A2-45-09 | | | | |
| RLP52 | A1-31-08 | A2-45-09 | | | | |
| RLP53 | A1-31-08 | A2-45-09 | | | | |
| RLP54 | A1-31-08 | A2-45-09 | | | | |
| RLP55 | A1-31-08 | A2-45-09 | | | | |
| RLP56 | A1-31-08 | A2-45-09 | | | | |
| RLP57 | A1-31-08 | A2-45-09 | | | | |
| RLP58 | A1-31-08 | A2-45-09 | | | | |
| RLP59 | A1-31-08 | A2-45-09 | | | | |
| RLP60 | A1-31-08 | A2-45-09 | | | | |
| RLP61 | A1-31-08 | A2-45-09 | | | | |
| RLP62 | A1-31-08 | A2-45-09 | | | | |
| RLP63 | A1-31-08 | A2-45-09 | | | | |
| RLP64 | A1-31-08 | A2-45-09 | | | | |
| RLP65 | A1-31-08 | A2-45-09 | | | | |
| RLP66 | A1-31-08 | A2-45-09 | | | | |
| RLP67 | A1-31-08 | A2-45-09 | | | | |
| RLP68 | A1-31-08 | A2-45-09 | | | | |
| RLP69 | A1-31-08 | A2-45-09 | | | | |
| RLP70 | A1-31-08 | A2-45-09 | | | | |
| RLP71 | A1-31-08 | A2-45-09 | | | | |
| RLP72 | A1-31-08 | A2-45-09 | | | | |
| RLP73 | A1-31-08 | A2-45-09 | | | | |
| RLP74 | A1-31-08 | A2-45-09 | | | | |
| RLP75 | A1-31-08 | A2-45-09 | | | | |
| RLP76 | A1-31-08 | A2-45-09 | | | | |
| RLP77 | A1-31-08 | A2-45-09 | | | | |
| RLP78 | A1-31-08 | A2-45-09 | | | | |
| RLP79 | A1-31-08 | A2-45-09 | | | | |
| RLP80 | A1-31-08 | A2-45-09 | | | | |
| RLP81 | A1-31-08 | A2-45-09 | | | | |
| RLP82 | A1-31-08 | A2-45-09 | | | | |
| RLP83 | A1-31-08 | A2-45-09 | | | | |
| RLP84 | A1-31-08 | A2-45-09 | | | | |
| RLP85 | A1-31-08 | A2-45-09 | | | | |
| RLP86 | A1-31-08 | A2-45-09 | | | | |
| RLP87 | A1-31-08 | A2-45-09 | | | | |
| RLP88 | A1-31-08 | A2-45-09 | | | | |
| RLP89 | A1-31-08 | A2-45-09 | | | | |
| RLP90 | A1-31-08 | A2-45-09 | | | | |
| RLP91 | A1-31-08 | A2-45-09 | | | | |
| RLP92 | A1-31-08 | A2-45-09 | | | | |
| RLP93 | A1-31-08 | A2-45-09 | | | | |
| RLP94 | A1-31-08 | A2-45-09 | | | | |
| RLP95 | A1-31-08 | A2-45-09 | | | | |
| RLP96 | A1-31-08 | A2-45-09 | | | | |
| RLP97 | A1-31-08 | A2-45-09 | | | | |
| RLP98 | A1-31-08 | A2-45-09 | | | | |
| RLP99 | A1-31-08 | A2-45-09 | | | | |
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| R014 | A1-14-15 | A2-30-19 | | | | |
| R015 | A1-10-05 | A2-27-06 | | | | |
| R016 | A1-11-15 | A2-12-12 | A2-12-12 | A2-27-15 | | |
| R02 | A1-30-14 | A2-44-11 | | | | |
| R03 | A1-30-04 | A2-43-12 | | | | |
| R04 | A1-28-13 | A2-43-14 | | | | |
| R05 | A1-15-06 | A2-43-19 | | | | |
| R06 | A1-29-13 | A2-45-06 | | | | |
| R07 | A1-14-09 | A2-44-17 | | | | |
| R08 | A1-30-13 | A2-43-18 | | | | |
| R09 | A1-30-03 | A2-41-15 | | | | |
| RS1 | A1-28-12 | A1-35-02 | A1-35-02 | A2-43-04 | | |
| RS1 | A1-28-02 | A1-36-12 | A1-36-12 | A2-19-04 | | |
| RS10 | A1-29-02 | A1-36-17 | A1-36-17 | A2-41-02 | | |
| RS10 | A1-30-12 | A1-38-07 | | | | |
| RS11 | A1-28-11 | A1-39-07 | | | | |
| RS11 | A1-30-02 | A1-39-17 | A1-39-17 | A2-40-02 | | |
| RS12 | A1-28-16 | A1-37-06 | | | | |
| RS12 | A1-29-15 | A1-37-04 | A1-37-16 | A2-40-13 | | |
| RS12 | A1-29-15 | A1-36-02 | A1-36-02 | A2-45-01 | | |
| RS2 | A1-29-05 | A1-34-11 | A1-34-11 | A2-41-06 | | |
| RS3 | A1-29-06 | A1-37-19 | A1-37-19 | A2-44-06 | | |
| RS3 | A1-27-02 | A1-37-09 | A1-37-09 | A2-40-14 | | |
| RS4 | A1-28-08 | A1-38-19 | A1-38-19 | A2-41-05 | A2-43-03 | |
| RS4 | A1-29-18 | A1-38-09 | | | | |
| RS5 | A1-25-11 | A1-39-19 | A1-39-19 | A2-40-06 | A2-44-09 | |
| RS5 | A1-29-09 | A1-39-09 | | | | |
| RS6 | A1-30-09 | A1-37-18 | A1-37-18 | A2-19-14 | A2-19-14 | A2-43-06 |
| RS6 | A1-25-15 | A1-37-08 | | | | |
| RS7 | A1-26-11 | A1-38-10 | A1-38-10 | A2-45-07 | | |
| RS7 | A1-27-15 | A1-38-08 | | | | |
| RS8 | A1-25-04 | A1-39-18 | A1-39-18 | A2-45-18 | | |
| RS8 | A1-27-14 | A1-39-08 | | | | |
| RS9 | A1-05-02 | A1-37-17 | A1-37-17 | A2-42-14 | | |
| RS9 | A1-05-12 | A1-37-07 | | | | |
| RX1 | A1-04-02 | A2-45-05 | | | | |
| RX1 | A2-09-02 | A2-36-18 | | | | |
| RX10 | A1-04-12 | A2-41-11 | | | | |
| RX11 | A1-06-03 | A2-42-03 | | | | |
| RX11 | A2-10-08 | A2-32-15 | | | | |
| RX12 | A1-06-18 | A2-41-14 | | | | |
| RX12 | A2-12-16 | A1-40-08 | | | | |
| RX13 | A1-10-04 | A2-26-04 | | | | |
| RX13 | A2-08-04 | A2-33-05 | | | | |
| RX14 | A1-15-08 | A2-29-09 | | | | |
| RX14 | A2-06-03 | A2-31-14 | | | | |
| RX15 | A1-13-06 | A2-28-07 | | | | |
| RX15 | A1-04-19 | A2-31-06 | | | | |
| RX16 | A1-13-17 | A1-42-12 | A1-42-12 | A2-26-05 | | |
| RX2 | A1-05-03 | A2-44-01 | | | | |
| RX2 | A2-09-15 | A2-34-17 | | | | |
| RX3 | A1-05-12 | A2-43-02 | | | | |
| RX3 | A2-09-18 | A2-32-17 | | | | |
| RX4 | A1-04-03 | A2-45-04 | | | | |
| RX5 | A1-27-07 | A2-43-03 | | | | |
| RX6 | A1-26-07 | A2-43-15 | | | | |
| RX7 | A1-13-13 | A2-44-07 | | | | |
| RX8 | A1-25-07 | A2-44-11 | | | | |
| RX8 | A1-04-13 | A2-41-05 | | | | |
| RX9 | A1-06-04 | A2-43-14 | | | | |
| RX10 | A1-06-14 | A2-41-01 | | | | |
| RX11 | A1-05-04 | A2-40-12 | | | | |
| RX12 | A1-05-14 | A2-41-04 | | | | |
| RX13 | A1-12-13 | A2-26-14 | | | | |
| RX14 | A1-14-09 | A2-29-19 | | | | |
| RX15 | A1-10-14 | A2-28-17 | | | | |
| RX16 | A1-04-04 | A1-44-15 | A1-44-15 | A2-26-15 | | |
| RX2 | A1-04-14 | A2-45-11 | | | | |
| RX3 | A1-06-03 | A2-44-12 | | | | |
| RX4 | A1-06-15 | A2-43-12 | | | | |
| RX5 | A1-05-05 | A2-44-19 | | | | |
| RX6 | A1-05-15 | A2-43-05 | | | | |
| RX7 | A1-25-19 | A2-45-17 | | | | |
| RX8 | A1-04-05 | A2-44-11 | | | | |
| RX9 | A1-06-15 | A2-41-05 | | | | |
| RZ1 | A1-06-07 | A2-26-07 | A2-26-07 | A2-40-08 | | |
| RZ1 | A1-06-16 | A2-27-17 | | | | |
| RZ10 | A1-05-06 | A2-30-18 | A2-30-18 | A2-42-17 | | |
| RZ10 | A1-05-16 | A2-39-07 | | | | |
| RZ11 | A1-04-06 | A2-29-08 | A2-29-08 | A2-42-07 | | |
| RZ11 | A1-04-16 | A2-31-01 | | | | |
| RZ12 | A1-04-07 | A2-27-01 | A2-27-01 | A2-40-16 | | |
| RZ12 | A1-06-17 | A2-32-05 | | | | |
| RZ13 | A1-13-19 | A2-36-06 | | | | |
| RZ13 | A1-13-03 | A2-36-08 | | | | |
| RZ14 | A1-13-02 | A2-41-16 | | | | |
| RZ14 | A1-10-11 | A2-34-07 | | | | |
| RZ15 | A1-15-13 | A2-41-06 | | | | |
| RZ15 | A1-14-03 | A2-35-07 | | | | |
| RZ16 | A1-15-17 | A2-42-16 | | | | |

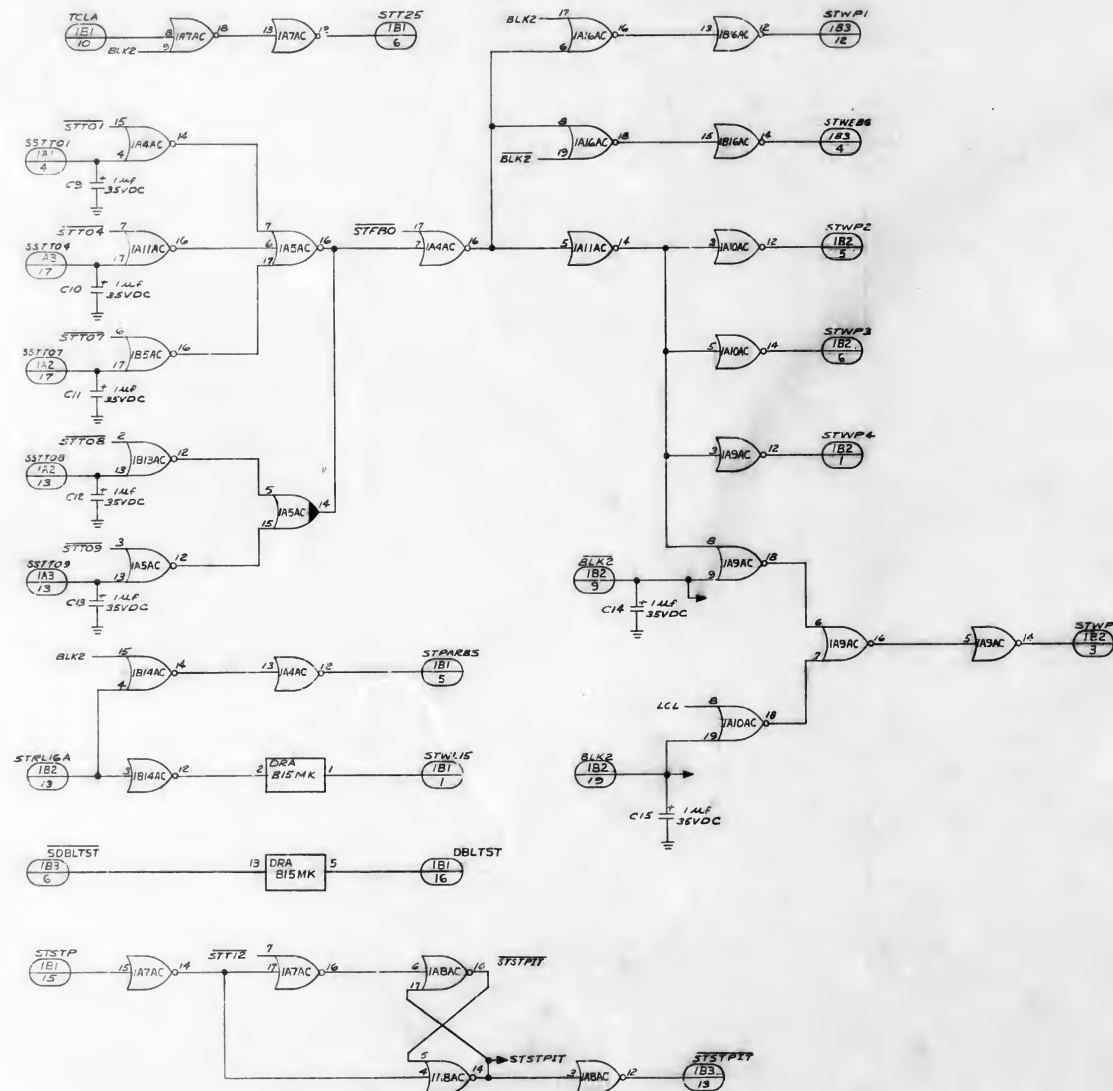
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| UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES ON DIMENSIONS ARE: FRACTIONS DECIMALS HOLE DIA. DO NOT SCALE DIMENSIONS RATINGS | | DRAWING NO. REV. NO. DATE DESCRIPTION NO. | |
| TITLE PROJECT DRAWING NO. REV. NO. DATE DESCRIPTION NO. | | LIST OF MATERIALS MANHOLE SPECIFICATION CENTER HOUSTON, TEXAS INTERCONNECTION PLANT AIR-AC-3-2-4 WIRE WRAP LIST 418 CTS DATE DRAWING NO. | |
| USED ON DATE | | SEE CODE BOOK NO. J 49956 2016-05 REVISIONS REVISION NO. DATE BY 1 11/20/16 J | |

| SIGNAL | FROM | TO | FROM | TO | FROM | TO |
|--------|----------|----------|----------|----------|----------|----------|
| STU | A2-04-06 | A2-27-16 | | | | |
| STU | A1-19-02 | A2-27-11 | | | | |
| STV | A2-03-15 | A2-29-01 | | | | |
| STV | A2-01-03 | A2-28-11 | A2-28-11 | A2-34-15 | | |
| SSWBBG | A1-27-16 | A3-08-15 | | | | |
| SSWBBG | A1-26-04 | A3-10-05 | | | | |
| SSWBBG | A3-04-03 | A3-18-03 | | | | |
| SSWBBG | A1-11-09 | A3-07-13 | | | | |
| SSWBBG | A1-25-14 | A3-09-07 | | | | |
| STVL15 | A3-03-17 | A3-18-17 | | | | |
| STWPI | A3-04-03 | A3-16-06 | A3-16-06 | A3-17-04 | | |
| STWPI | A3-01-09 | A3-17-06 | | | | |
| STWPI | A3-02-19 | A3-17-16 | | | | |
| STWPI | A3-05-01 | A3-16-04 | A3-16-04 | A3-17-14 | | |
| STWPI | A3-06-01 | A3-17-19 | | | | |
| STI | A1-33-13 | A2-01-06 | A2-01-06 | A2-20-01 | | |
| STI | A1-35-13 | A2-17-16 | | | | |
| STI | A1-35-09 | A2-18-07 | | | | |
| STI | A1-45-14 | A2-22-11 | | | | |
| STI | A1-32-16 | A1-35-07 | | | | |
| STI | A1-31-16 | A1-34-07 | | | | |
| STI | A1-35-17 | A2-20-03 | | | | |
| STI | A1-34-17 | A1-32-06 | | | | |
| STI | A1-31-06 | A1-36-16 | | | | |
| STI | A1-36-08 | A2-20-11 | | | | |
| STI | A1-20-06 | A2-02-13 | A2-02-13 | A3-01-05 | | |
| STI | A1-12-03 | A2-35-09 | | | | |
| STI | A2-06-07 | | | | | |
| STI | A2-03-03 | A2-35-13 | | | | |
| STI | A2-05-08 | A2-36-19 | | | | |
| STI | A2-02-03 | A2-34-09 | | | | |
| STI | A2-01-12 | | | | | |
| STI | A1-19-03 | A2-01-05 | | | | |
| STI | A1-16-06 | A1-42-04 | | | | |
| STI | A1-18-15 | A1-40-03 | | | | |
| STI | A1-16-13 | A1-41-13 | | | | |
| STI | A1-17-03 | A2-03-02 | | | | |
| STI | A1-18-13 | A1-41-03 | | | | |
| STI | A1-16-02 | A1-42-13 | | | | |
| STI | A1-16-17 | A1-42-03 | | | | |
| STI | A1-17-06 | A1-42-12 | | | | |
| STI | A1-18-02 | A1-41-12 | | | | |
| STI | A2-02-02 | A3-31-06 | | | | |
| STI | A1-20-17 | A1-42-02 | A1-42-02 | A3-32-13 | | |
| STI | A1-20-16 | A1-40-11 | A1-40-11 | A3-32-02 | | |
| STI | A1-43-19 | A3-31-12 | | | | |
| STI | A1-43-09 | A3-32-16 | | | | |
| STI | A1-44-19 | A3-33-03 | | | | |
| STI | A2-02-04 | A3-32-12 | | | | |
| STI | A3-33-14 | | | | | |
| STI | A2-03-06 | A3-33-06 | | | | |
| STI | A3-31-04 | | | | | |
| STI | A2-02-16 | A3-32-14 | | | | |
| STI | A2-06-16 | A3-31-16 | | | | |
| STI | A1-44-09 | A3-31-05 | | | | |
| STI | A3-32-05 | | | | | |
| STI | A2-11-03 | A3-31-15 | | | | |
| STI | A3-31-14 | | | | | |
| STI | A2-12-03 | A3-33-04 | | | | |
| STI | A2-03-12 | | | | | |
| STI | A1-18-12 | A2-36-16 | | | | |
| STI | A1-31-14 | A2-21-04 | | | | |
| STI | A2-01-04 | A2-22-18 | A2-22-18 | A2-35-12 | | |
| STI | A2-02-14 | A2-23-09 | A2-23-09 | A2-34-18 | | |
| STI | A2-18-02 | A2-36-06 | | | | |
| STI | A2-09-03 | A2-17-01 | | | | |
| STI | A2-09-13 | A2-24-09 | | | | |
| STI | A1-32-08 | A2-17-06 | | | | |
| STI | A1-31-17 | A2-19-13 | | | | |
| STI | A1-04-07 | A2-25-01 | | | | |
| STI | A1-04-17 | A2-27-02 | | | | |
| STI | A1-06-08 | A2-25-16 | | | | |
| STI | A1-05-08 | A1-05-18 | A1-05-18 | A1-06-18 | A1-06-08 | A1-06-08 |
| STI | A1-08-08 | A1-17-05 | A1-17-05 | A1-17-13 | A1-17-13 | A1-20-11 |
| STI | A1-20-13 | A1-20-13 | A1-20-13 | A1-21-07 | A1-21-07 | A1-21-14 |
| STI | A1-21-14 | A1-21-14 | A1-21-14 | A1-31-13 | A1-31-13 | A1-32-19 |
| STI | A1-32-19 | A1-37-04 | A1-37-04 | A1-37-14 | A1-37-14 | A2-01-17 |
| STI | A2-01-17 | A2-05-09 | A2-05-09 | A2-05-19 | A2-05-19 | A2-07-07 |
| STI | A2-07-07 | A2-10-01 | A2-10-01 | A2-14-11 | A2-14-11 | A2-14-12 |
| STI | A2-14-12 | A2-15-03 | A2-15-03 | A2-15-07 | A2-15-07 | A2-15-14 |
| STI | A2-15-14 | A2-15-14 | A2-15-14 | A2-20-09 | A2-20-09 | A2-25-13 |
| STI | A2-25-13 | A2-34-08 | A2-34-08 | A2-37-02 | A2-37-02 | A2-38-03 |
| STI | A2-38-03 | A2-39-03 | A2-39-03 | A2-39-05 | A2-39-05 | A2-40-18 |
| STI | A2-40-18 | A3-06-13 | A3-06-13 | A3-07-16 | A3-07-16 | A3-09-25 |
| STI | A3-09-25 | A3-09-04 | A3-09-04 | A3-10-16 | A3-10-16 | A3-17-05 |
| STI | A3-17-05 | A3-17-13 | A3-17-13 | A3-18-12 | A3-18-12 | A3-19-13 |
| STI | A3-19-13 | A3-21-15 | A3-21-15 | A3-28-04 | A3-28-04 | A3-29-03 |
| STI | A3-29-03 | A3-28-09 | A3-28-09 | A3-28-14 | A3-28-14 | A3-28-15 |
| STI | A3-28-15 | A3-28-19 | A3-28-19 | A3-29-04 | A3-29-04 | A3-29-05 |

| SIGNAL | FROM | TO | FROM | TO | FROM | TO |
|--------|-----------|-----------|-----------|-----------|-----------|-----------|
| IOV | A3-29-03 | A3-29-06 | A3-29-06 | A3-29-14 | A3-29-14 | A3-29-15 |
| IOV | A3-29-15 | A3-30-03 | A3-30-03 | A3-30-06 | A3-30-06 | A3-30-15 |
| IOV | A3-30-15 | A3-30-16 | | | | |
| IOVWL | A3-10-06 | A3-21-03 | | | | |
| IOVWL | A1-20-01 | A3-30-07 | | | | |
| IOVWL | A1-20-02 | A1-20-04 | A1-20-04 | A2-14-02 | A2-14-02 | A3-29-07 |
| IOVWL | A2-14-01 | A3-29-13 | | | | |
| IOVWL | A1-17-13 | A2-14-04 | A2-14-04 | A2-15-17 | A2-15-17 | A3-30-08 |
| IOVWL | A1-04-08 | A1-04-18 | A1-04-18 | A1-05-09 | A1-05-09 | A1-05-19 |
| IOVWL | A1-05-19 | A1-06-03 | A1-06-03 | A1-10-06 | A1-10-06 | A1-14-19 |
| IOVWL | A1-14-19 | A3-30-11 | A3-30-11 | A1-21-03 | A1-21-03 | A1-21-12 |
| IOVWL | A1-21-12 | A1-26-09 | A1-26-09 | A1-28-01 | A1-28-01 | A1-31-13 |
| IOVWL | A1-31-13 | A1-43-07 | A1-43-07 | A2-02-06 | A2-02-06 | A2-03-04 |
| IOVWL | A2-03-04 | A2-03-13 | A2-03-13 | A2-06-03 | A2-06-03 | A2-06-19 |
| IOVWL | A2-06-19 | A2-07-17 | A2-07-17 | A2-11-01 | A2-11-01 | A2-11-07 |
| IOVWL | A2-11-07 | A2-12-17 | A2-12-17 | A2-15-12 | A2-15-12 | A2-21-01 |
| IOVWL | A2-21-01 | A2-22-01 | A2-22-01 | A2-22-19 | A2-22-19 | A2-23-13 |
| IOVWL | A2-23-13 | A2-35-08 | A2-35-08 | A2-35-19 | A2-35-19 | A3-06-14 |
| IOVWL | A2-36-14 | A3-07-11 | A3-07-11 | A3-19-01 | A3-19-01 | A3-19-08 |
| IOVWL | A3-19-08 | A3-20-01 | A3-20-01 | A3-20-11 | A3-20-11 | A3-21-11 |
| IOVWL | A3-21-11 | A3-28-01 | A3-28-01 | A3-28-02 | A3-28-02 | A3-28-13 |
| IOVWL | A3-28-13 | A3-29-01 | A3-29-01 | A3-29-02 | A3-29-02 | A3-29-03 |
| IOVWL | A3-29-03 | A3-29-11 | A3-29-11 | A3-29-12 | A3-29-12 | A3-30-01 |
| IOVWL | A3-30-01 | A3-30-06 | A3-30-06 | A3-30-09 | A3-30-09 | A3-30-04 |
| IOVWL | A3-30-04 | A3-30-16 | A3-30-16 | A3-30-18 | A3-30-18 | A3-30-14 |
| IOVWL | A3-30-14 | A1-31-19 | A3-30-11 | A1-28-01 | A3-29-07 | A1-26-09 |
| IOVWL | A3-29-11 | A1-31-19 | A3-30-02 | A2-12-17 | A3-30-12 | A2-11-07 |
| IOVWL | A3-07-11 | A2-03-08 | A3-28-02 | A2-23-13 | | |
| IOVWL | A1-19-01 | A2-17-03 | | | | |
| IOVWL | A2-04-17 | A2-32-11 | A2-32-11 | A3-08-17 | | |
| IOVWL | A3-08-17 | A2-25-02 | | | | |
| IOVWL | A2-01-11 | | | | | |
| IOVWL | A2-01-16 | | | | | |
| IOVWL | A3-01-04 | A3-22-01 | A3-22-01 | A3-14-03 | | |
| IOVWL | A2-31-02 | A3-24-11 | A3-24-11 | A3-14-12 | | |
| IOVWL | | | | | | |
| IOVWL | A1-13-10 | A1-14-10 | A1-14-10 | A1-14-20 | A1-14-20 | A1-15-10 |
| IOVWL | A1-15-10 | A1-15-20 | A1-15-20 | A1-16-10 | A1-16-10 | A1-16-20 |
| IOVWL | A1-16-20 | A1-17-10 | A1-17-10 | A1-17-20 | A1-17-20 | A1-18-20 |
| IOVWL | A1-18-20 | A1-22-10 | A1-22-10 | A1-22-20 | A1-22-20 | A1-23-20 |
| IOVWL | A1-23-20 | A1-23-20 | A1-23-20 | A1-24-20 | A1-24-20 | A1-24-20 |
| IOVWL | A1-24-20 | A1-25-10 | A1-25-10 | A1-26-20 | A1-26-20 | A1-26-20 |
| IOVWL | A1-26-20 | A1-30-20 | A1-30-20 | A1-31-10 | A1-31-10 | A1-31-20 |
| IOVWL | A1-31-20 | A1-32-10 | A1-32-10 | A1-32-20 | A1-32-20 | A1-33-10 |
| IOVWL | A1-33-10 | A1-33-10 | A1-33-10 | A1-33-20 | A1-33-20 | A1-34-10 |
| IOVWL | A1-34-10 | A1-35-10 | A1-35-10 | A1-36-20 | A1-36-20 | A1-37-20 |
| IOVWL | A1-37-20 | A1-38-20 | A1-38-20 | A1-39-20 | A1-39-20 | A1-40-20 |
| IOVWL | A1-40-20 | A1-41-10 | A1-41-10 | A1-42-20 | A1-42-20 | A1-43-20 |
| IOVWL | A1-43-20 | A1-44-20 | A1-44-20 | A1-45-20 | A1-45-20 | A1-46-20 |
| IOVWL | A1-46-20 | A1-47-20 | A1-47-20 | A1-48-20 | A1-48-20 | A1-49-20 |
| IOVWL | A1-49-20 | A1-50-20 | A1-50-20 | A1-51-20 | A1-51-20 | A1-52-20 |
| IOVWL | A1-52-20 | A1-53-20 | A1-53-20 | A1-54-20 | A1-54-20 | A1-55-20 |
| IOVWL | A1-55-20 | A1-56-20 | A1-56-20 | A1-57-20 | A1-57-20 | A1-58-20 |
| IOVWL | A1-58-20 | A1-59-20 | A1-59-20 | A1-60-20 | A1-60-20 | A1-61-20 |
| IOVWL | A1-61-20 | A1-62-20 | A1-62-20 | A1-63-20 | A1-63-20 | A1-64-20 |
| IOVWL | A1-64-20 | A1-65-20 | A1-65-20 | A1-66-20 | A1-66-20 | A1-67-20 |
| IOVWL | A1-67-20 | A1-68-20 | A1-68-20 | A1-69-20 | A1-69-20 | A1-70-20 |
| IOVWL | A1-70-20 | A1-71-20 | A1-71-20 | A1-72-20 | A1-72-20 | A1-73-20 |
| IOVWL | A1-73-20 | A1-74-20 | A1-74-20 | A1-75-20 | A1-75-20 | A1-76-20 |
| IOVWL | A1-76-20 | A1-77-20 | A1-77-20 | A1-78-20 | A1-78-20 | A1-79-20 |
| IOVWL | A1-79-20 | A1-80-20 | A1-80-20 | A1-81-20 | A1-81-20 | A1-82-20 |
| IOVWL | A1-82-20 | A1-83-20 | A1-83-20 | A1-84-20 | A1-84-20 | A1-85-20 |
| IOVWL | A1-85-20 | A1-86-20 | A1-86-20 | A1-87-20 | A1-87-20 | A1-88-20 |
| IOVWL | A1-88-20 | A1-89-20 | A1-89-20 | A1-90-20 | A1-90-20 | A1-91-20 |
| IOVWL | A1-91-20 | A1-92-20 | A1-92-20 | A1-93-20 | A1-93-20 | A1-94-20 |
| IOVWL | A1-94-20 | A1-95-20 | A1-95-20 | A1-96-20 | A1-96-20 | A1-97-20 |
| IOVWL | A1-97-20 | A1-98-20 | A1-98-20 | A1-99-20 | A1-99-20 | A1-100-20 |
| IOVWL | A1-100-20 | A1-101-20 | A1-101-20 | A1-102-20 | A1-102-20 | A1-103-20 |
| IOVWL | A1-103-20 | A1-104-20 | A1-104-20 | A1-105-20 | A1-105-20 | A1-106-20 |
| IOVWL | A1-106-20 | A1-107-20 | A1-107-20 | A1-108-20 | A1-108-20 | A1-109-20 |
| IOVWL | A1-109-20 | A1-110-20 | A1-110-20 | A1-111-20 | A1-111-20 | A1-112-20 |
| IOVWL | A1-112-20 | A1-113-20 | A1-113-20 | A1-114-20 | A1-114-20 | A1-115-20 |
| IOVWL | A1-115-20 | A1-116-20 | A1-116-20 | A1-117-20 | A1-117-20 | A1-118-20 |
| IOVWL | A1-118-20 | A1-119-20 | A1-119-20 | A1-120-20 | A1-120-20 | A1-121-20 |
| IOVWL | A1-121-20 | A1-122-20 | A1-122-20 | A1-123-20 | A1-123-20 | A1-124-20 |
| IOVWL | A1-124-20 | A1-125-20 | A1-125-20 | A1-126-20 | A1-126-20 | A1-127-20 |
| IOVWL | A1-127-20 | A1-128-20 | A1-128-20 | A1-129-20 | A1-129-20 | A1-130-20 |
| IOVWL | A1-130-20 | A1-131-20 | A1-131-20 | A1-132-20 | A1-132-20 | A1-133-20 |
| IOVWL | A1-133-20 | A1-134-20 | A1-134-20 | A1-135-20 | A1-135-20 | A1-136-20 |
| IOVWL | A1-136-20 | A1-137-20 | A1-137-20 | A1-138-20 | A1-138-20 | A1-139-20 |
| IOVWL | A1-139-20 | A1-140-20 | A1-140-20 | A1-141-20 | A1-141-20 | A1-142-20 |
| IOVWL | A1-142-20 | A1-143-20 | A1-143-20 | A1-144-20 | A1-144-20 | A1-145-20 |
| IOVWL | A1-145-20 | A1-146-20 | A1-146-20 | A1-147-20 | A1-147-20 | A1-148-20 |
| IOVWL | A1-148-20 | A1-149-20 | A1-149-20 | A1-150-20 | A1-150-20 | A1-151-20 |
| IOVWL | A1-151-20 | A1-152-20 | A1-152-20 | A1-153-20 | A1-153-20 | A1-154-20 |



201469 F

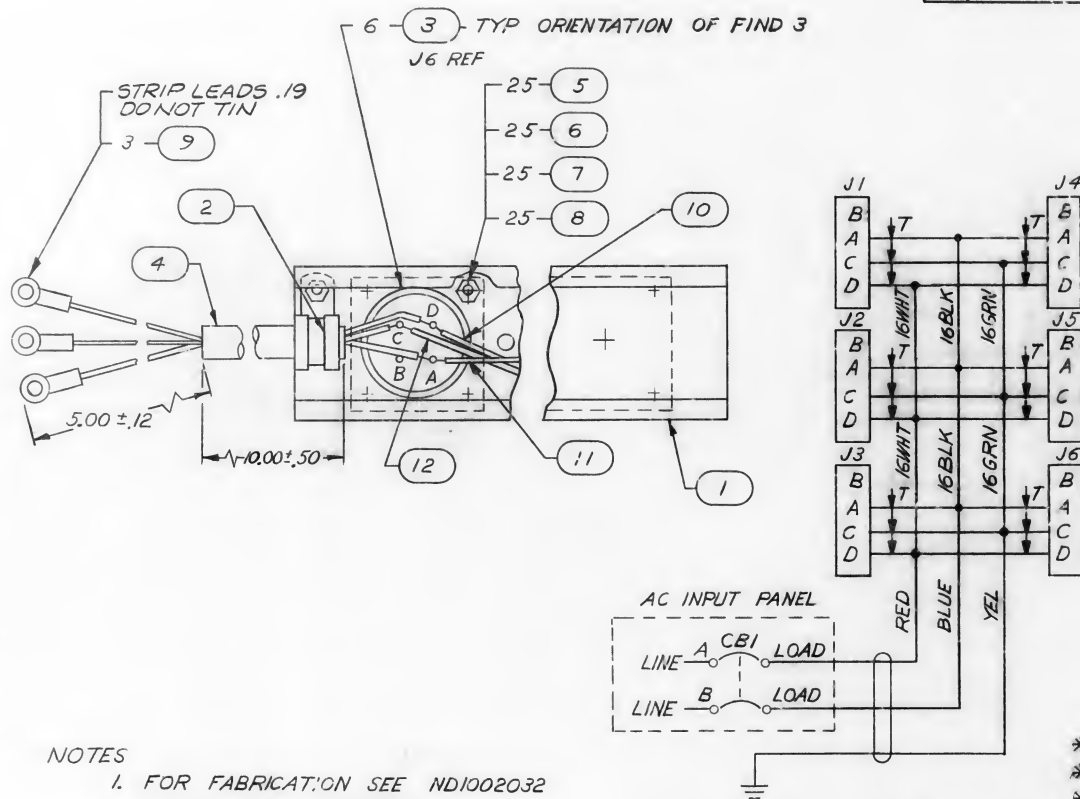


| RELEASES | | DATE | APPROVED |
|----------|--|------|----------|
| INIT | DESCRIPTION | | |
| O | RELEASED PER CJA RES 488 | | |
| | - CLASS B NO CHANGE PER CJA RES 502 | 1/26 | 1/26 |
| A | CHANGED PER CJA RES 730.05 AND CLASS A RELEASED PER TORR 45474 | 1/26 | 1/26 |
| B | CHANGED PER TORR 26668 | 1/26 | 1/26 |
| | DR G 9.1 W/CHUNK CJA 60 | 1/26 | 1/26 |
| C | CHANGED PER TORR 26668 OR G 9.1 W/CHUNK CJA 60 | 1/26 | 1/26 |
| D | CHANGED PER TORR 26668 DR G 9.1 W/CHUNK CJA 60 | 1/26 | 1/26 |
| | ADDED PER TORR 25587 | 1/26 | 1/26 |
| | DR G 9.1 W/CHUNK CJA 60 | 1/26 | 1/26 |
| F | CHANGED PER TORR 2576 | 1/26 | 1/26 |
| | DR G 9.1 W/CHUNK CJA 60 | 1/26 | 1/26 |

| | | | |
|---|--|--|---|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS DIMENSIONS APPLICABLE | | QTY REQD PART OR IDENTIFYING NO NOMINAL SIZE OR DESCRIPTION LIST OF MATERIALS | E.S.N. NO.1 |
| 1. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS DIMENSIONS APPLICABLE 2. NO SET BACK DIMENSIONS 3. MATERIALS | | SPECIFICATIONS CONTRACT NO. W-103 DRAWING NO. 2014169 DESIGNED BY W. J. B. J. CHECKED BY W. J. B. J. APPROVED BY W. J. B. J. SPECIAL INSTRUCTIONS M.A.S.A. APPROVAL SET APPROVAL SET REVISIONS | MANOVED SPACECRAFT CENTER HOUSTON, TEXAS LOGIC DIAGRAM SELF TEST-PLATE 1 COMPUTER TEST SET QUANTITY ORDERED REQD 49956 J DATE ORDERED 2014169 |
| EXIST. ALTY. USED OR APPR. CATION | | | |

2016332

| REVISIONS | | | |
|-----------|-------------------------------|------|----------|
| SYM | DESCRIPTION | DATE | APPROVED |
| - | CLASS A RELEASE PER TDR 24660 | | |



SCHEMATIC DIAGRAM

NOTES

1. FOR FABRICATION SEE ND1002032
2. SOLDER PER ND1002071
3. CRIMP PER ND1002206
4. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
5. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATIONS PREFIX WITH UNIT NUMBER OR SUB-ASSEMBLY DESIGNATIONS
6. STRIP LEADS .50 ± .06 & TIN PER ND1002071, UNLESS OTHERWISE SPECIFIED.

* DENOTES LENGTH IN FEET

| * 1.5 | MIL-W-16878/4 E16 GRN | WIRE, ELECTRICAL | 12 |
|---------|-------------------------|-----------------------------|----------|
| * 1.5 | MIL-W-16878/4 E16 BLK | WIRE, ELECTRICAL | 11 |
| * 1.5 | MIL-W-16878/4 E16 WHT | WIRE, ELECTRICAL | 10 |
| 3 | MS25036-8 | LUG, TERMINAL | 9 |
| 25 | MS35649-44 | NUT, HEX | 8 |
| 25 | MS35338-78 | WASHER, LOCK | 7 |
| 25 | MS15795-804 | WASHER, FLAT | 6 |
| 25 | MS51957-15 | SCREW, MACH, PAN HD | 5 |
| * 1.5 | 1006966-2 | CABLE, ELECTRICAL | 4 |
| 6 | MS3102A-20-4S | CONN, REC | 3 |
| 1 | MS21919DG-6 | CLAMP, CUSHIONED | 2 |
| 1 | 2016336-001 | BRACKET | 1 |
| QTY REQ | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO. |
| -011 | LIST OF MATERIALS | | |

| | | | | | |
|---|---------|--|----------------|---|--|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS DECIMALS ANGLES .XX .XXX ± ±.03 ± ± | | RAYTHEON CO. LEXINGTON, MASS. CONTRACT NO. NAS 9-497 DRAWN <i>R. D. Smith</i> DATE 9 DEC 63 CHECKED <i>Chalky</i> 10/22/63 APPROVAL <i>R. D. Smith</i> 10/22/63 APPROVAL <i>R. D. Smith</i> 10/22/63 NASA APPROVAL <i>A. C. MEYZGER</i> MIT APPROVAL <i>W. C. Smith</i> 10/22/63 MIT APPROVAL <i>R. D. Smith</i> 10/22/63 | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS BRACKET ASSEMBLY AC CONNECTOR NASA DRAWING NO. 2016332 | |
| 2014059 | | SIZE | CODE IDENT NO. | SCALE 1/1 WT | |
| 2014049 | | C 49956 | | SHEET 1 OF 1 | |
| NEXT ASSY | USED ON | | | | |
| APPLICATION | | | | | |

| SIGNAL | FROM | TO | FROM | TO | FROM | TO |
|-----------|----------|----------|----------|-----------|-----------|-----------|
| ACSP1 | A1-34-12 | A2-26-12 | | | | |
| ACSP2 | A1-34-02 | A2-27-02 | | | | |
| BLK2 | A1-28-05 | A2-18-03 | A2-18-03 | A2-18-17 | A2-18-17 | A3-02-07 |
| BLK2C | A2-18-16 | A2-25-12 | | | | |
| BLK2C | A2-18-09 | A2-15-07 | | | | |
| B2 | A2-07-04 | A2-20-04 | | | | |
| C1B | A2-06-06 | A2-33-04 | A2-06-06 | A1-19-13 | | |
| CNTK1 | A2-20-02 | A2-29-12 | | | | |
| CNTK2 | A2-20-02 | A2-29-12 | | | | |
| CNTD4 | A2-11-05 | A2-27-12 | | | | |
| CNTD4 | A2-07-15 | A2-31-13 | | | | |
| CNTK1A | A1-18-03 | A2-05-03 | A2-05-03 | A2-29-12 | | |
| CNTK2A | A1-27-17 | A2-06-02 | | | | |
| CNTK3A | A1-26-17 | A2-07-06 | | | | |
| CNTK4 | A1-32-03 | A2-04-03 | A2-04-03 | A2-32-17 | | |
| CNTK5A | A1-14-17 | A2-06-17 | | | | |
| CNTK6A | A1-18-13 | A1-15-07 | A1-15-07 | A2-06-13 | | |
| CNTK7A | A1-27-08 | A2-03-05 | | | | |
| CNTK8A | A1-29-17 | A2-07-19 | A2-07-19 | A2-36-09 | | |
| JAB | A1-24-12 | A2-07-19 | A2-07-19 | A2-32-17 | | |
| DAG | A1-44-12 | A2-15-01 | A2-15-01 | A2-26-01 | | |
| DALP(DAL) | A1-43-02 | A2-10-09 | A2-10-09 | A2-25-11 | | |
| DAQ | A1-42-14 | A2-14-01 | A2-14-01 | A2-26-11 | | |
| DAY | A2-08-16 | A2-13-11 | A2-13-11 | A2-27-01 | | |
| DTEST | A3-02-04 | A2-16-11 | | | | |
| EDK10 | A1-28-09 | A2-10-19 | | | | |
| EDK10 | A1-30-16 | A2-10-19 | A2-10-19 | A2-29-03 | | |
| EDK11 | A1-28-03 | A2-16-19 | | | | |
| EDK11 | A1-29-14 | A2-10-09 | A2-10-09 | A2-29-17 | | |
| EDK12 | A1-30-08 | A2-11-19 | | | | |
| EDK13 | A1-27-04 | A2-09-01 | A2-09-01 | A2-30-17 | | |
| EDK11 | A1-11-06 | A1-38-16 | A1-38-16 | A2-29-07 | A2-29-07 | A2-39-14 |
| EDK11 | A1-12-16 | A1-38-06 | | | | |
| EDK12 | A1-12-16 | A1-38-06 | | | | |
| EDK13 | A1-07-13 | A1-39-16 | A1-39-16 | A2-28-03 | A2-28-03 | A2-39-04 |
| EDK13 | A1-11-02 | A1-37-05 | | | | |
| EDK13 | A1-13-06 | A1-37-15 | A1-37-15 | A2-30-14 | A2-30-14 | A2-37-13 |
| EDK14 | A1-10-12 | A1-38-05 | | | | |
| EDK14 | A1-10-13 | A1-38-15 | A1-38-15 | A2-28-18 | A2-28-18 | A2-37-13 |
| EDK15 | A1-11-02 | A1-38-15 | A1-38-15 | A2-28-18 | A2-28-18 | A2-37-13 |
| EDK16 | A1-11-08 | A1-38-05 | | | | |
| EDK17 | A2-07-11 | A2-23-01 | | | | |
| EDK18 | A2-08-12 | A2-25-11 | | | | |
| EDK19 | A2-07-03 | A2-23-11 | | | | |
| EDK20 | A1-11-17 | A2-25-11 | | | | |
| EDK21 | A2-12-08 | A2-25-11 | | | | |
| EDK22 | A2-10-17 | A2-27-01 | | | | |
| GRD | A1-01-10 | A1-01-20 | A1-01-20 | A1-02-10 | A1-02-10 | A1-02-20 |
| GRD | A1-02-10 | A1-03-10 | A1-03-10 | A1-03-20 | A1-03-20 | A1-03-30 |
| GRD | A1-04-10 | A1-04-20 | A1-04-20 | A1-05-10 | A1-05-10 | A1-05-20 |
| GRD | A1-05-10 | A1-06-10 | A1-06-10 | A1-06-20 | A1-06-20 | A1-06-30 |
| GRD | A1-07-10 | A1-07-20 | A1-07-20 | A1-08-10 | A1-08-10 | A1-08-20 |
| GRD | A1-08-10 | A1-09-10 | A1-09-10 | A1-09-20 | A1-09-20 | A1-09-30 |
| GRD | A1-10-10 | A1-10-20 | A1-10-20 | A1-11-10 | A1-11-10 | A1-11-20 |
| GRD | A1-11-10 | A1-11-20 | A1-11-20 | A1-12-10 | A1-12-10 | A1-12-20 |
| GRD | A1-12-10 | A1-12-20 | A1-12-20 | A1-13-10 | A1-13-10 | A1-13-20 |
| GRD | A1-13-10 | A1-13-20 | A1-13-20 | A1-14-10 | A1-14-10 | A1-14-20 |
| GRD | A1-14-10 | A1-14-20 | A1-14-20 | A1-15-10 | A1-15-10 | A1-15-20 |
| GRD | A1-15-10 | A1-15-20 | A1-15-20 | A1-16-10 | A1-16-10 | A1-16-20 |
| GRD | A1-16-10 | A1-16-20 | A1-16-20 | A1-17-10 | A1-17-10 | A1-17-20 |
| GRD | A1-17-10 | A1-17-20 | A1-17-20 | A1-18-10 | A1-18-10 | A1-18-20 |
| GRD | A1-18-10 | A1-18-20 | A1-18-20 | A1-19-10 | A1-19-10 | A1-19-20 |
| GRD | A1-19-10 | A1-19-20 | A1-19-20 | A1-20-10 | A1-20-10 | A1-20-20 |
| GRD | A1-20-10 | A1-20-20 | A1-20-20 | A1-21-10 | A1-21-10 | A1-21-20 |
| GRD | A1-21-10 | A1-21-20 | A1-21-20 | A1-22-10 | A1-22-10 | A1-22-20 |
| GRD | A1-22-10 | A1-22-20 | A1-22-20 | A1-23-10 | A1-23-10 | A1-23-20 |
| GRD | A1-23-10 | A1-23-20 | A1-23-20 | A1-24-10 | A1-24-10 | A1-24-20 |
| GRD | A1-24-10 | A1-24-20 | A1-24-20 | A1-25-10 | A1-25-10 | A1-25-20 |
| GRD | A1-25-10 | A1-25-20 | A1-25-20 | A1-26-10 | A1-26-10 | A1-26-20 |
| GRD | A1-26-10 | A1-26-20 | A1-26-20 | A1-27-10 | A1-27-10 | A1-27-20 |
| GRD | A1-27-10 | A1-27-20 | A1-27-20 | A1-28-10 | A1-28-10 | A1-28-20 |
| GRD | A1-28-10 | A1-28-20 | A1-28-20 | A1-29-10 | A1-29-10 | A1-29-20 |
| GRD | A1-29-10 | A1-29-20 | A1-29-20 | A1-30-10 | A1-30-10 | A1-30-20 |
| GRD | A1-30-10 | A1-30-20 | A1-30-20 | A1-31-10 | A1-31-10 | A1-31-20 |
| GRD | A1-31-10 | A1-31-20 | A1-31-20 | A1-32-10 | A1-32-10 | A1-32-20 |
| GRD | A1-32-10 | A1-32-20 | A1-32-20 | A1-33-10 | A1-33-10 | A1-33-20 |
| GRD | A1-33-10 | A1-33-20 | A1-33-20 | A1-34-10 | A1-34-10 | A1-34-20 |
| GRD | A1-34-10 | A1-34-20 | A1-34-20 | A1-35-10 | A1-35-10 | A1-35-20 |
| GRD | A1-35-10 | A1-35-20 | A1-35-20 | A1-36-10 | A1-36-10 | A1-36-20 |
| GRD | A1-36-10 | A1-36-20 | A1-36-20 | A1-37-10 | A1-37-10 | A1-37-20 |
| GRD | A1-37-10 | A1-37-20 | A1-37-20 | A1-38-10 | A1-38-10 | A1-38-20 |
| GRD | A1-38-10 | A1-38-20 | A1-38-20 | A1-39-10 | A1-39-10 | A1-39-20 |
| GRD | A1-39-10 | A1-39-20 | A1-39-20 | A1-40-10 | A1-40-10 | A1-40-20 |
| GRD | A1-40-10 | A1-40-20 | A1-40-20 | A1-41-10 | A1-41-10 | A1-41-20 |
| GRD | A1-41-10 | A1-41-20 | A1-41-20 | A1-42-10 | A1-42-10 | A1-42-20 |
| GRD | A1-42-10 | A1-42-20 | A1-42-20 | A1-43-10 | A1-43-10 | A1-43-20 |
| GRD | A1-43-10 | A1-43-20 | A1-43-20 | A1-44-10 | A1-44-10 | A1-44-20 |
| GRD | A1-44-10 | A1-44-20 | A1-44-20 | A1-45-10 | A1-45-10 | A1-45-20 |
| GRD | A1-45-10 | A1-45-20 | A1-45-20 | A1-46-10 | A1-46-10 | A1-46-20 |
| GRD | A1-46-10 | A1-46-20 | A1-46-20 | A1-47-10 | A1-47-10 | A1-47-20 |
| GRD | A1-47-10 | A1-47-20 | A1-47-20 | A1-48-10 | A1-48-10 | A1-48-20 |
| GRD | A1-48-10 | A1-48-20 | A1-48-20 | A1-49-10 | A1-49-10 | A1-49-20 |
| GRD | A1-49-10 | A1-49-20 | A1-49-20 | A1-50-10 | A1-50-10 | A1-50-20 |
| GRD | A1-50-10 | A1-50-20 | A1-50-20 | A1-51-10 | A1-51-10 | A1-51-20 |
| GRD | A1-51-10 | A1-51-20 | A1-51-20 | A1-52-10 | A1-52-10 | A1-52-20 |
| GRD | A1-52-10 | A1-52-20 | A1-52-20 | A1-53-10 | A1-53-10 | A1-53-20 |
| GRD | A1-53-10 | A1-53-20 | A1-53-20 | A1-54-10 | A1-54-10 | A1-54-20 |
| GRD | A1-54-10 | A1-54-20 | A1-54-20 | A1-55-10 | A1-55-10 | A1-55-20 |
| GRD | A1-55-10 | A1-55-20 | A1-55-20 | A1-56-10 | A1-56-10 | A1-56-20 |
| GRD | A1-56-10 | A1-56-20 | A1-56-20 | A1-57-10 | A1-57-10 | A1-57-20 |
| GRD | A1-57-10 | A1-57-20 | A1-57-20 | A1-58-10 | A1-58-10 | A1-58-20 |
| GRD | A1-58-10 | A1-58-20 | A1-58-20 | A1-59-10 | A1-59-10 | A1-59-20 |
| GRD | A1-59-10 | A1-59-20 | A1-59-20 | A1-60-10 | A1-60-10 | A1-60-20 |
| GRD | A1-60-10 | A1-60-20 | A1-60-20 | A1-61-10 | A1-61-10 | A1-61-20 |
| GRD | A1-61-10 | A1-61-20 | A1-61-20 | A1-62-10 | A1-62-10 | A1-62-20 |
| GRD | A1-62-10 | A1-62-20 | A1-62-20 | A1-63-10 | A1-63-10 | A1-63-20 |
| GRD | A1-63-10 | A1-63-20 | A1-63-20 | A1-64-10 | A1-64-10 | A1-64-20 |
| GRD | A1-64-10 | A1-64-20 | A1-64-20 | A1-65-10 | A1-65-10 | A1-65-20 |
| GRD | A1-65-10 | A1-65-20 | A1-65-20 | A1-66-10 | A1-66-10 | A1-66-20 |
| GRD | A1-66-10 | A1-66-20 | A1-66-20 | A1-67-10 | A1-67-10 | A1-67-20 |
| GRD | A1-67-10 | A1-67-20 | A1-67-20 | A1-68-10 | A1-68-10 | A1-68-20 |
| GRD | A1-68-10 | A1-68-20 | A1-68-20 | A1-69-10 | A1-69-10 | A1-69-20 |
| GRD | A1-69-10 | A1-69-20 | A1-69-20 | A1-70-10 | A1-70-10 | A1-70-20 |
| GRD | A1-70-10 | A1-70-20 | A1-70-20 | A1-71-10 | A1-71-10 | A1-71-20 |
| GRD | A1-71-10 | A1-71-20 | A1-71-20 | A1-72-10 | A1-72-10 | A1-72-20 |
| GRD | A1-72-10 | A1-72-20 | A1-72-20 | A1-73-10 | A1-73-10 | A1-73-20 |
| GRD | A1-73-10 | A1-73-20 | A1-73-20 | A1-74-10 | A1-74-10 | A1-74-20 |
| GRD | A1-74-10 | A1-74-20 | A1-74-20 | A1-75-10 | A1-75-10 | A1-75-20 |
| GRD | A1-75-10 | A1-75-20 | A1-75-20 | A1-76-10 | A1-76-10 | A1-76-20 |
| GRD | A1-76-10 | A1-76-20 | A1-76-20 | A1-77-10 | A1-77-10 | A1-77-20 |
| GRD | A1-77-10 | A1-77-20 | A1-77-20 | A1-78-10 | A1-78-10 | A1-78-20 |
| GRD | A1-78-10 | A1-78-20 | A1-78-20 | A1-79-10 | A1-79-10 | A1-79-20 |
| GRD | A1-79-10 | A1-79-20 | A1-79-20 | A1-80-10 | A1-80-10 | A1-80-20 |
| GRD | A1-80-10 | A1-80-20 | A1-80-20 | A1-81-10 | A1-81-10 | A1-81-20 |
| GRD | A1-81-10 | A1-81-20 | A1-81-20 | A1-82-10 | A1-82-10 | A1-82-20 |
| GRD | A1-82-10 | A1-82-20 | A1-82-20 | A1-83-10 | A1-83-10 | A1-83-20 |
| GRD | A1-83-10 | A1-83-20 | A1-83-20 | A1-84-10 | A1-84-10 | A1-84-20 |
| GRD | A1-84-10 | A1-84-20 | A1-84-20 | A1-85-10 | A1-85-10 | A1-85-20 |
| GRD | A1-85-10 | A1-85-20 | A1-85-20 | A1-86-10 | A1-86-10 | A1-86-20 |
| GRD | A1-86-10 | A1-86-20 | A1-86-20 | A1-87-10 | A1-87-10 | A1-87-20 |
| GRD | A1-87-10 | A1-87-20 | A1-87-20 | A1-88-10 | A1-88-10 | A1-88-20 |
| GRD | A1-88-10 | A1-88-20 | A1-88-20 | A1-89-10 | A1-89-10 | A1-89-20 |
| GRD | A1-89-10 | A1-89-20 | A1-89-20 | A1-90-10 | A1-90-10 | A1-90-20 |
| GRD | A1-90-10 | A1-90-20 | A1-90-20 | A1-91-10 | A1-91-10 | A1-91-20 |
| GRD | A1-91-10 | A1-91-20 | A1-91-20 | A1-92-10 | A1-92-10 | A1-92-20 |
| GRD | A1-92-10 | A1-92-20 | A1-92-20 | A1-93-10 | A1-93-10 | A1-93-20 |
| GRD | A1-93-10 | A1-93-20 | A1-93-20 | A1-94-10 | A1-94-10 | A1-94-20 |
| GRD | A1-94-10 | A1-94-20 | A1-94-20 | A1-95-10 | A1-95-10 | A1-95-20 |
| GRD | A1-95-10 | A1-95-20 | A1-95-20 | A1-96-10 | A1-96-10 | A1-96-20 |
| GRD | A1-96-10 | A1-96-20 | A1-96-20 | A1-97-10 | A1-97-10 | A1-97-20 |
| GRD | A1-97-10 | A1-97-20 | A1-97-20 | A1-98-10 | A1-98-10 | A1-98-20 |
| GRD | A1-98-10 | A1-98-20 | A1-98-20 | A1-99-10 | A1-99-10 | A1-99-20 |
| GRD | A1-99-10 | A1-99-20 | A1-99-20 | A1-100-10 | A1-100-10 | A1-100-20 |

NOTES
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR COMPLETE DESIGNATIONS PREFIX WITH SUB-ASSEMBLY DESIGNATIONS

| 6 | | | 5 | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| SIGNAL | FROM | TO | FROM | TO | FROM | TO |
| GRD | A2-23-20 | A2-23-10 | A2-23-10 | A2-23-20 | A2-23-10 | A2-23-10 |
| | A2-24-20 | A2-24-10 | A2-24-10 | A2-24-20 | A2-24-10 | A2-24-10 |
| | A2-25-20 | A2-25-10 | A2-25-10 | A2-25-20 | A2-25-10 | A2-25-10 |
| | A2-26-20 | A2-26-10 | A2-26-10 | A2-26-20 | A2-26-10 | A2-26-10 |
| A2-27-10 | A2-27-20 | A2-27-20 | A2-28-10 | A2-28-10 | A2-28-10 | A2-28-10 |
| A2-28-20 | A2-29-10 | A2-29-10 | A2-29-20 | A2-29-20 | A2-29-10 | A2-29-10 |
| A2-30-10 | A2-30-20 | A2-30-20 | A2-31-10 | A2-31-10 | A2-31-10 | A2-31-10 |
| A2-31-20 | A2-32-10 | A2-32-10 | A2-32-20 | A2-32-20 | A2-32-10 | A2-32-10 |
| A2-33-10 | A2-33-20 | A2-33-20 | A2-34-10 | A2-34-10 | A2-34-10 | A2-34-10 |
| A2-35-10 | A2-35-10 | A2-35-10 | A2-35-20 | A2-35-20 | A2-35-10 | A2-35-10 |
| A2-36-10 | A2-36-20 | A2-36-20 | A2-37-10 | A2-37-10 | A2-37-10 | A2-37-10 |
| A2-37-20 | A2-38-10 | A2-38-10 | A2-38-20 | A2-38-20 | A2-38-10 | A2-38-10 |
| A2-39-10 | A2-39-20 | A2-39-20 | A2-40-10 | A2-40-10 | A2-40-10 | A2-40-10 |
| A2-41-10 | A2-41-20 | A2-41-20 | A2-42-10 | A2-42-10 | A2-42-10 | A2-42-10 |
| A2-43-10 | A2-43-20 | A2-43-20 | A2-44-10 | A2-44-10 | A2-44-10 | A2-44-10 |
| A2-45-10 | A2-45-20 | A2-45-20 | A2-46-10 | A2-46-10 | A2-46-10 | A2-46-10 |
| A2-47-10 | A2-47-20 | A2-47-20 | A2-48-10 | A2-48-10 | A2-48-10 | A2-48-10 |
| A2-49-10 | A2-49-20 | A2-49-20 | A2-50-10 | A2-50-10 | A2-50-10 | A2-50-10 |
| A2-51-10 | A2-51-20 | A2-51-20 | A2-52-10 | A2-52-10 | A2-52-10 | A2-52-10 |
| A2-53-10 | A2-53-20 | A2-53-20 | A2-54-10 | A2-54-10 | A2-54-10 | A2-54-10 |
| A2-55-10 | A2-55-20 | A2-55-20 | A2-56-10 | A2-56-10 | A2-56-10 | A2-56-10 |
| A2-57-10 | A2-57-20 | A2-57-20 | A2-58-10 | A2-58-10 | A2-58-10 | A2-58-10 |
| A2-59-10 | A2-59-20 | A2-59-20 | A2-60-10 | A2-60-10 | A2-60-10 | A2-60-10 |
| A2-61-10 | A2-61-20 | A2-61-20 | A2-62-10 | A2-62-10 | A2-62-10 | A2-62-10 |
| A2-63-10 | A2-63-20 | A2-63-20 | A2-64-10 | A2-64-10 | A2-64-10 | A2-64-10 |
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| A2-67-10 | A2-67-20 | A2-67-20 | A2-68-10 | A2-68-10 | A2-68-10 | A2-68-10 |
| A2-69-10 | A2-69-20 | A2-69-20 | A2-70-10 | A2-70-10 | A2-70-10 | A2-70-10 |
| A2-71-10 | A2-71-20 | A2-71-20 | A2-72-10 | A2-72-10 | A2-72-10 | A2-72-10 |
| A2-73-10 | A2-73-20 | A2-73-20 | A2-74-10 | A2-74-10 | A2-74-10 | A2-74-10 |
| A2-75-10 | A2-75-20 | A2-75-20 | A2-76-10 | A2-76-10 | A2-76-10 | A2-76-10 |
| A2-77-10 | A2-77-20 | A2-77-20 | A2-78-10 | A2-78-10 | A2-78-10 | A2-78-10 |
| A2-79-10 | A2-79-20 | A2-79-20 | A2-80-10 | A2-80-10 | A2-80-10 | A2-80-10 |
| A2-81-10 | A2-81-20 | A2-81-20 | A2-82-10 | A2-82-10 | A2-82-10 | A2-82-10 |
| A2-83-10 | A2-83-20 | A2-83-20 | A2-84-10 | A2-84-10 | A2-84-10 | A2-84-10 |
| A2-85-10 | A2-85-20 | A2-85-20 | A2-86-10 | A2-86-10 | A2-86-10 | A2-86-10 |
| A2-87-10 | A2-87-20 | A2-87-20 | A2-88-10 | A2-88-10 | A2-88-10 | A2-88-10 |
| A2-89-10 | A2-89-20 | A2-89-20 | A2-90-10 | A2-90-10 | A2-90-10 | A2-90-10 |
| A2-91-10 | A2-91-20 | A2-91-20 | A2-92-10 | A2-92-10 | A2-92-10 | A2-92-10 |
| A2-93-10 | A2-93-20 | A2-93-20 | A2-94-10 | A2-94-10 | A2-94-10 | A2-94-10 |
| A2-95-10 | A2-95-20 | A2-95-20 | A2-96-10 | A2-96-10 | A2-96-10 | A2-96-10 |
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| A2-99-10 | A2-99-20 | A2-99-20 | A2-100-10 | A2-100-10 | A2-100-10 | A2-100-10 |
| A2-101-10 | A2-101-20 | A2-101-20 | A2-102-10 | A2-102-10 | A2-102-10 | A2-102-10 |
| A2-103-10 | A2-103-20 | A2-103-20 | A2-104-10 | A2-104-10 | A2-104-10 | A2-104-10 |
| A2-105-10 | A2-105-20 | A2-105-20 | A2-106-10 | A2-106-10 | A2-106-10 | A2-106-10 |
| A2-107-10 | A2-107-20 | A2-107-20 | A2-108-10 | A2-108-10 | A2-108-10 | A2-108-10 |
| A2-109-10 | A2-109-20 | A2-109-20 | A2-110-10 | A2-110-10 | A2-110-10 | A2-110-10 |
| A2-111-10 | A2-111-20 | A2-111-20 | A2-112-10 | A2-112-10 | A2-112-10 | A2-112-10 |
| A2-113-10 | A2-113-20 | A2-113-20 | A2-114-10 | A2-114-10 | A2-114-10 | A2-114-10 |
| A2-115-10 | A2-115-20 | A2-115-20 | A2-116-10 | A2-116-10 | A2-116-10 | A2-116-10 |
| A2-117-10 | A2-117-20 | A2-117-20 | A2-118-10 | A2-118-10 | A2-118-10 | A2-118-10 |
| A2-119-10 | A2-119-20 | A2-119-20 | A2-120-10 | A2-120-10 | A2-120-10 | A2-120-10 |
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| A2-275-10 | A2-275-20 | A2-275-20 | A2-276-10 | A2-276-10 | A2-276-10 | A2-276-10 |
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| A2-279-10 | A2-279-20 | A2-279-20 | A2-280-10 | A2-280-10 | A2-280-10 | A2-280-10 |
| A2-281-10 | | | | | | |

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| SIGNAL | FROM | TO | FROM | TO | FROM | TO |
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| STU | A2-04-06 | A2-27-16 | | | | |
| STU | A1-19-02 | A2-27-11 | | | | |
| STV | A2-03-15 | A2-29-01 | | | | |
| STV | A2-01-03 | A2-28-11 | A2-28-11 | A2-34-15 | | |
| SSTWBG | A1-27-16 | A3-09-15 | | | | |
| SSTWBG | A1-26-04 | A3-10-05 | | | | |
| SSTWBG | A3-04-03 | A3-18-02 | | | | |
| SSTWFGK | A1-11-09 | A3-07-15 | | | | |
| SSTWGC | A1-25-14 | A3-09-07 | | | | |
| STWL5 | A3-03-17 | A3-19-17 | | | | |
| STWPI | A3-04-02 | A3-16-06 | A3-16-06 | A3-17-04 | | |
| STWPI | A3-01-09 | A3-17-06 | | | | |
| STWPI | A3-02-19 | A3-17-16 | | | | |
| STWPI | A3-05-01 | A3-16-04 | A3-16-04 | A3-17-14 | | |
| STWPI | A3-06-01 | A3-17-15 | | | | |
| STI | A1-33-19 | A2-01-06 | A2-01-06 | A2-20-01 | | |
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| SEMO | A1-34-17 | A1-38-06 | | | | |
| SESA | A1-31-06 | A1-36-18 | | | | |
| SEST | A1-36-09 | A2-20-11 | A1-36-08 | A1-08-18 | | |
| TCLA | A1-20-06 | A2-02-13 | A2-02-13 | A3-01-05 | | |
| TMOA | A2-12-09 | A2-35-09 | | | | |
| TMOB | A2-06-07 | | | | | |
| TMAA | A2-03-03 | A2-35-19 | | | | |
| TMAA | A2-05-08 | A2-36-19 | | | | |
| TMAA | A2-02-05 | A2-31-09 | | | | |
| TMAA | A2-01-12 | | | | | |
| TMAA | A1-19-03 | A2-01-05 | | | | |
| TMAA | A1-16-06 | A1-48-04 | | | | |
| TMAA | A1-18-15 | A1-40-03 | | | | |
| TMAA | A1-16-13 | A1-41-13 | | | | |
| TMAA | A1-17-03 | A2-03-02 | | | | |
| TMAA | A1-18-13 | A1-41-03 | | | | |
| TMAA | A1-16-02 | A1-42-13 | | | | |
| TMAA | A1-16-17 | A1-42-03 | | | | |
| TMAA | A1-17-06 | A1-40-12 | | | | |
| TMAA | A1-18-02 | A1-41-12 | | | | |
| TMAA | A2-02-02 | A3-31-06 | | | | |
| TMAA | A1-20-17 | A1-42-02 | A1-42-02 | A3-32-13 | | |
| TMAA | A1-20-17 | A1-40-11 | A1-40-11 | A3-32-02 | | |
| TMAA | A1-43-19 | A3-31-16 | | | | |
| TMAA | A3-03-09 | A3-32-16 | | | | |
| TMAA | A1-44-19 | A3-33-05 | | | | |
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| TMAA | A3-31-04 | | | | | |
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| TMAA | A2-06-16 | A3-31-16 | | | | |
| TMAA | A1-44-09 | A3-31-05 | | | | |
| TMAA | A3-32-03 | | | | | |
| TMAA | A2-11-03 | A3-31-15 | | | | |
| TMAA | A3-31-14 | | | | | |
| TMAA | A2-12-03 | A3-33-04 | | | | |
| TMAA | A2-03-12 | | | | | |
| TMAA | A2-18-12 | A2-36-16 | A2-18-12 | A1-06-12 | | |
| TMAA | A1-31-14 | A2-21-04 | | | | |
| TMAA | A2-01-04 | A2-22-18 | A2-22-18 | A2-35-12 | | |
| TMAA | A2-17-02 | | | | | |
| TMAA | A2-02-14 | A2-23-09 | A2-23-09 | A2-34-18 | | |
| TMAA | A2-18-02 | A2-36-06 | | | | |
| TMAA | A2-04-03 | A2-17-01 | | | | |
| TMAA | A2-09-13 | A2-24-09 | | | | |
| TMAA | A1-32-08 | A2-17-06 | | | | |
| TMAA | A1-31-17 | A2-13-13 | | | | |
| TMAA | A1-04-07 | A2-25-01 | | | | |
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| TMAA | A1-06-08 | A2-25-16 | | | | |
| TMAA | A1-05-08 | A1-05-18 | A1-05-18 | A1-06-18 | A1-06-18 | A1-06-18 |
| TMAA | A1-08-08 | A1-17-05 | A1-17-13 | A1-17-13 | A1-17-13 | A1-17-13 |
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| TMAA | A1-21-14 | A1-21-15 | A1-21-15 | A1-31-13 | A1-31-13 | A1-32-19 |
| TMAA | A1-32-19 | A1-37-04 | A1-37-04 | A1-37-14 | A1-37-14 | A2-01-17 |
| TMAA | A2-01-17 | A2-05-09 | A2-05-09 | A2-05-19 | A2-05-19 | A2-07-07 |
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| TMAA | A2-14-12 | A2-15-03 | A2-15-03 | A2-15-07 | A2-15-07 | A2-15-14 |
| TMAA | A2-15-14 | A2-15-19 | A2-15-19 | A2-22-03 | A2-22-03 | A2-25-13 |
| TMAA | A2-25-13 | A2-34-08 | A2-34-08 | A2-37-02 | A2-37-02 | A2-38-03 |
| TMAA | A2-38-03 | A2-39-03 | A2-39-03 | A2-39-05 | A2-39-05 | A2-40-18 |
| TMAA | A2-40-18 | A3-06-19 | A3-06-19 | A3-07-16 | A3-07-16 | A3-08-05 |
| TMAA | A3-08-05 | A3-09-04 | A3-09-04 | A3-10-16 | A3-10-16 | A3-11-02 |
| TMAA | A3-11-02 | A3-11-18 | A3-11-18 | A3-12-12 | A3-12-12 | A3-13-13 |
| TMAA | A3-13-13 | A3-21-15 | A3-21-15 | A3-28-04 | A3-28-04 | A3-28-05 |
| TMAA | A3-28-05 | A3-28-09 | A3-28-09 | A3-28-14 | A3-28-14 | A3-28-15 |
| TMAA | A3-28-15 | A3-28-19 | A3-28-19 | A3-29-04 | A3-29-04 | A3-29-05 |

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| | 6 | | | 5 | | |
| SIGNAL | FROM | TO | FROM | TO | FROM | TO |
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| 10V | A3-29-15 | A3-30-05 | A3-30-05 | A3-30-06 | A3-30-06 | A3-30-15 |
| 10V | A3-30-15 | A3-30-16 | A3-30-16 | A3-31-04 | | |
| 10VWL | A3-30-06 | A3-31-03 | | | | |
| 13VCI | A1-20-01 | A3-30-07 | | | | |
| 13VPS | A1-20-02 | A1-20-04 | A1-20-04 | A2-14-02 | A2-14-02 | A3-29-07 |
| 20VCI | A1-20-19 | | | | | |
| 20V.5 | A1-21-17 | A2-14-04 | A2-14-04 | A2-15-17 | A2-15-17 | A3-30-08 |
| 3V | A1-04-08 | A1-04-18 | A1-04-18 | A1-05-09 | A1-05-09 | A1-05-19 |
| | A1-05-19 | A1-06-09 | A1-06-09 | A1-10-06 | A1-10-06 | A1-14-19 |
| | A1-14-19 | A3-30-11 | A3-30-11 | A1-21-03 | A1-21-03 | A1-21-12 |
| | A1-21-12 | A1-26-09 | A1-26-09 | A1-28-01 | A1-28-01 | A1-31-19 |
| | A1-31-19 | A1-43-07 | A1-43-07 | A2-08-06 | A2-08-06 | A2-08-04 |
| | A2-03-04 | A2-03-13 | A2-03-13 | A2-06-09 | A2-06-09 | A2-06-13 |
| | A2-06-13 | A2-07-17 | A2-07-17 | A2-11-01 | A2-11-01 | A2-11-07 |
| | A2-11-07 | A2-12-17 | A2-12-17 | A2-15-12 | A2-15-12 | A2-21-01 |
| | A2-21-01 | A2-22-01 | A2-22-01 | A2-22-19 | A2-22-19 | A2-23-13 |
| | A2-23-13 | A2-35-08 | A2-35-08 | A2-35-19 | A2-35-19 | A2-35-19 |
| | A3-06-14 | A3-07-11 | A3-07-11 | A3-19-01 | A3-19-01 | A3-19-02 |
| | A3-19-02 | A3-20-01 | A3-20-01 | A3-20-11 | A3-20-11 | A3-21-11 |
| | A3-21-11 | A3-20-01 | A3-20-01 | A3-28-02 | A3-28-02 | A3-28-13 |
| | A3-28-13 | A3-29-01 | A3-29-01 | A3-29-06 | A3-29-06 | A3-29-03 |
| | A3-29-03 | A3-29-11 | A3-29-11 | A3-29-12 | A3-29-12 | A3-30-01 |
| | A3-30-01 | A3-30-12 | A3-30-12 | A3-30-03 | A3-30-03 | A3-30-04 |
| | A3-30-04 | A3-30-12 | A3-30-12 | A3-30-13 | A3-30-13 | A3-30-14 |
| 3V | A3-30-01 | A1-31-19 | A3-30-11 | A1-28-01 | A3-29-01 | A1-26-09 |
| 3V | A3-29-11 | A1-18-19 | A3-30-02 | A2-12-17 | A3-30-12 | A2-11-07 |
| 3V | A3-07-11 | A2-03-04 | A3-28-02 | A2-23-13 | | |
| BOO | A1-19-01 | A2-17-03 | | | | |
| CLA | A2-18-17 | A2-32-11 | | | | |
| SK | A2-12-06 | A2-25-02 | A2-32-11 | A3-02-17 | A2-04-17 | A1-19-12 |
| TSR8B | A2-01-11 | | | | | |
| TSR8B | A2-01-16 | | | | | |
| MOBLIST | A3-01-04 | A3-22-01 | A3-22-01 | A3-14-03 | | |
| MOOSCAL | A2-31-02 | A3-22-11 | A3-22-11 | A3-14-13 | | |
| GRD | A1-13-10 | A1-14-10 | A1-14-10 | A1-16-20 | A1-16-20 | A1-15-10 |
| | A1-15-10 | A1-15-20 | A1-15-20 | A1-16-10 | A1-16-10 | A1-16-20 |
| | A1-16-20 | A1-17-10 | A1-17-10 | A1-17-20 | A1-17-20 | A1-18-20 |
| | A1-18-20 | A1-22-10 | A1-22-10 | A1-22-20 | A1-22-20 | A1-23-10 |
| | A1-23-10 | A1-23-20 | A1-23-20 | A1-24-10 | A1-24-10 | A1-24-20 |
| | A1-24-20 | A1-25-10 | A1-25-10 | A1-26-20 | A1-26-20 | A1-27-10 |
| | A1-27-10 | A1-30-20 | A1-30-20 | A1-31-10 | A1-31-10 | A1-32-10 |
| | A1-31-20 | A1-32-10 | A1-32-10 | A1-32-20 | A1-32-20 | A1-33-10 |
| | A1-33-10 | A1-33-20 | A1-33-20 | A1-34-10 | A1-34-10 | A1-35-10 |
| | A1-35-10 | A1-36-10 | A1-36-10 | A1-37-10 | A1-37-10 | A1-38-10 |
| | A1-38-10 | A1-39-10 | A1-39-10 | A1-40-10 | A1-40-10 | A1-41-10 |
| | A1-41-10 | A1-42-10 | A1-42-10 | A1-43-10 | A1-43-10 | A1-44-10 |
| | A1-44-10 | A1-45-10 | A1-45-10 | A1-46-10 | A1-46-10 | A1-47-10 |
| | A1-47-10 | A1-48-10 | A1-48-10 | A1-49-10 | A1-49-10 | A1-50-10 |
| | A1-50-10 | A1-51-10 | A1-51-10 | A1-52-10 | A1-52-10 | A1-53-10 |
| | A1-53-10 | A1-54-10 | A1-54-10 | A1-55-10 | A1-55-10 | A1-56-10 |
| | A1-56-10 | A1-57-10 | A1-57-10 | A1-58-10 | A1-58-10 | A1-59-10 |
| | A1-59-10 | A1-60-10 | A1-60-10 | A1-61-10 | A1-61-10 | A1-62-10 |
| | A1-62-10 | A1-63-10 | A1-63-10 | A1-64-10 | A1-64-10 | A1-65-10 |
| | A1-65-10 | A1-66-10 | A1-66-10 | A1-67-10 | A1-67-10 | A1-68-10 |
| | A1-68-10 | A1-69-10 | A1-69-10 | A1-70-20 | A1-70-20 | A1-70-10 |
| | A1-70-10 | A3-39-20 | A3-39-20 | A3-39-10 | A3-39-10 | A3-38-20 |
| | A3-38-20 | A3-38-10 | A3-38-10 | A3-37-20 | A3-37-20 | A3-37-10 |
| | A3-37-10 | A3-36-20 | A3-36-20 | A3-36-10 | A3-36-10 | A3-35-20 |
| | A3-35-10 | A3-34-20 | A3-34-20 | A3-34-10 | A3-34-10 | A3-33-20 |
| | A3-33-20 | A3-32-20 | A3-32-20 | A3-31-10 | A3-31-10 | A3-30-20 |
| GRD | A1-13-10 | A1-18-16 | | | | |
| ABA | | | A3-31-20 | A3-31-19 | A3-31-19 | A3-31-17 |
| ABA | A3-31-17 | A3-32-03 | A3-32-03 | A3-32-06 | A3-32-04 | A3-33-09 |
| ABA | A3-33-02 | A3-33-13 | A3-33-13 | A3-33-15 | A3-33-15 | A4ABA |



| SYMBOL REFERENCE | | |
|------------------|--------------------|---------------------|
| KEY CODE | MODULE TYPE | SCHEMATIC NUMBER |
| AC | NOR | 1014036 |
| KH | GATED FLIP FLOP | 1014072 |
| MK | DRIVER MODULE | 1014123 |

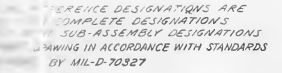
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NOTES

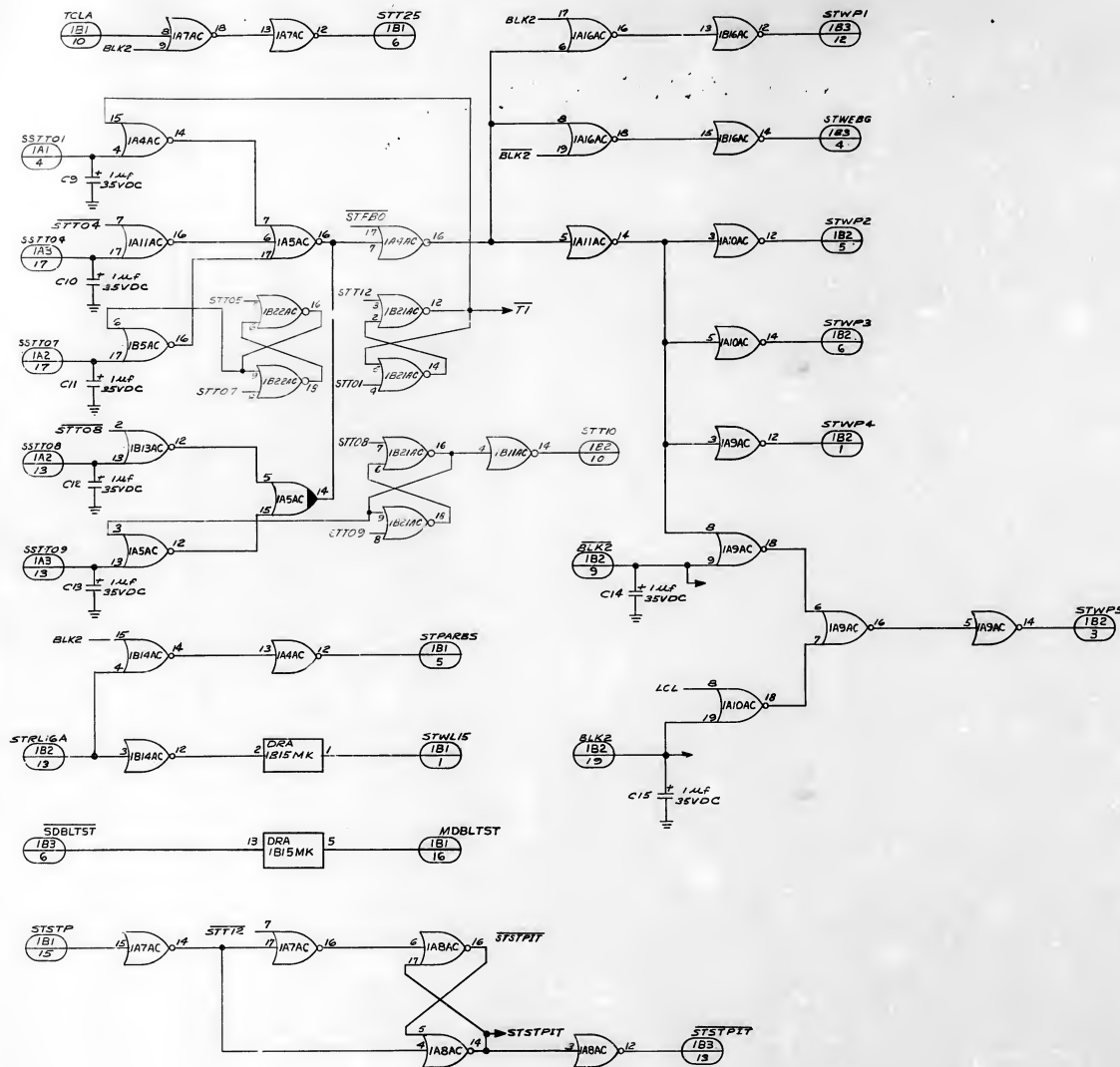
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATIONS PREFIX WITH SUB-ASSEMBLY DESIGNATIONS
2. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REFERENCE
1. ASSEMBLY DWG 2014.362

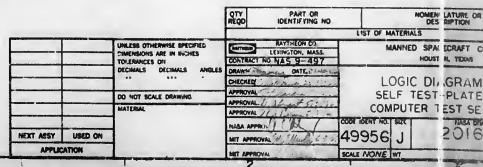
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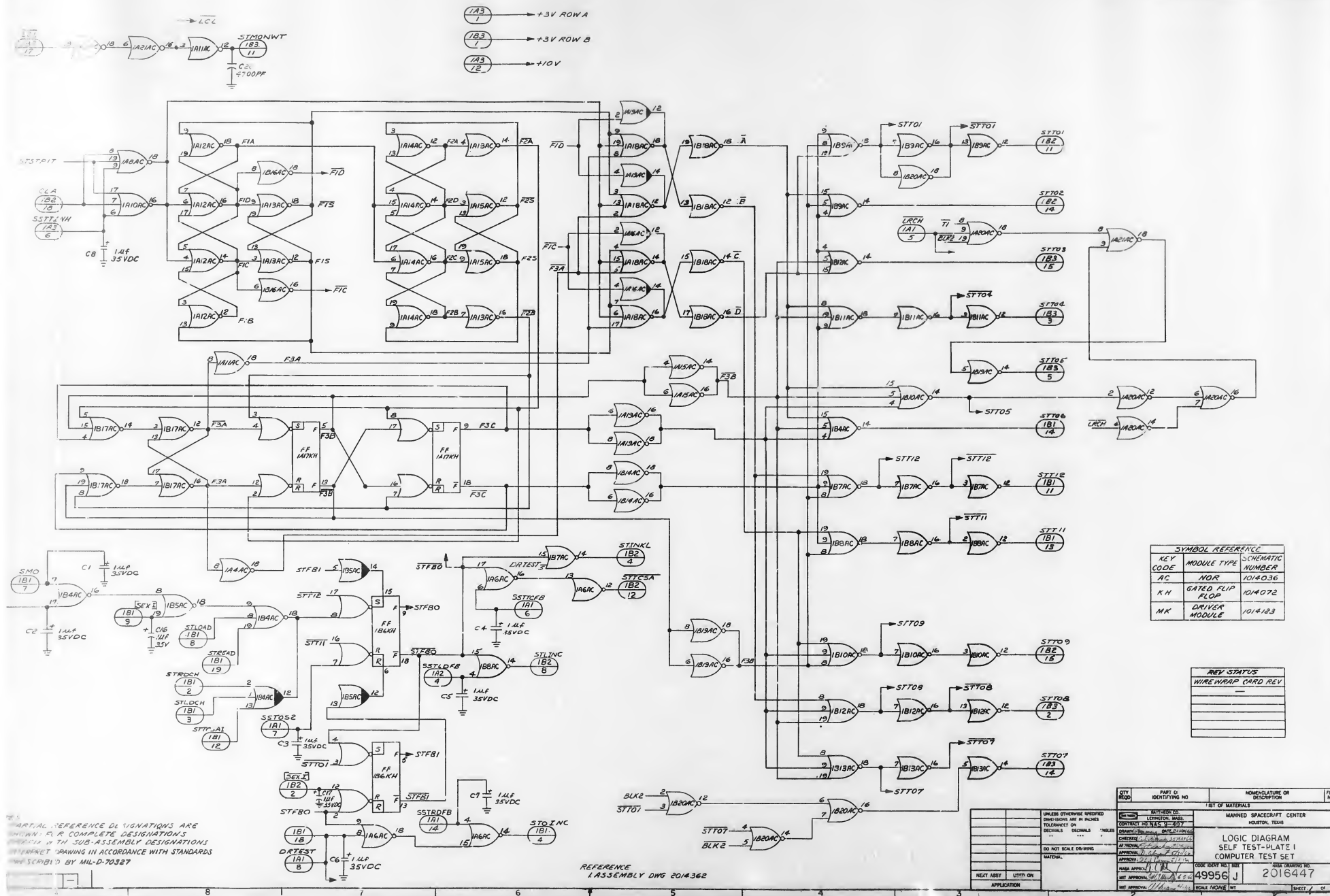


| | | | | |
|--|---------|---|-----------------------------|---------|
| QTY | | PART OR IDENTIFYING NO | NOMENCLATURE OR DESCRIPTION | FIND NO |
| | | | LIST OF MATERIALS | |
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS DECIMALS AND ANGLES " " " | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | | |
| DO NOT SCALE DRAWING | | LOGIC DIAGRAM SELF TEST-PLATE I COMPUTER TEST SET | | |
| MATERIAL | | NADA DRAWING NO. | | |
| NEXT ASSY | USED ON | NADA APPR. & C. BY MTHBBS | DATE | REV |
| APPLICATION | | SEE APPROVAL [Signature] | 49956 J | 201638 |
| | | SCALE NONE ET | SHEET 7 OF 8 | |



| | | | | | |
|--|-----------|-------------------------------|----------------------------|---|------------|
| | | QTY REQD | PART OR IDENTIFYING NO. | WOMEN ATTIRE OR DESCRIPTION | FIND NO |
| LIST OF MATERIALS | | | | | |
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS .0005 ANGLES .001 | | BATH-ROOM CO. LONDON, MASS | | MARINE SPACECRAFT CENTER HOUSTON, TEXAS | |
| | | COUNTRY NO. 945 37 87 47 | | | |
| | | (JANUARY) DATE RECEIVED | | | |
| | | CHANGED | | | |
| | | APPROVAL: [Signature] | | | |
| | | APPROVAL: [Signature] | | | |
| | | DO NOT SCALE (PRINTING) | | | |
| | MATERIAL: | | | LOGIC DIAGRAM SELF TEST-PIATE COMPUTER TEST SET | |
| | | MADE APPROVAL: [Signature] | | | |
| | | NET APPROVAL: [Signature] | | | |
| NEXT ASBY | USED ON | | COUNT CONT'D NO. BOX | SALT DRAWING NO. | |
| | | | 49956 J | 16395 | |
| APPLICATION | | | BOOK NUMBER | SHEET # OF | |





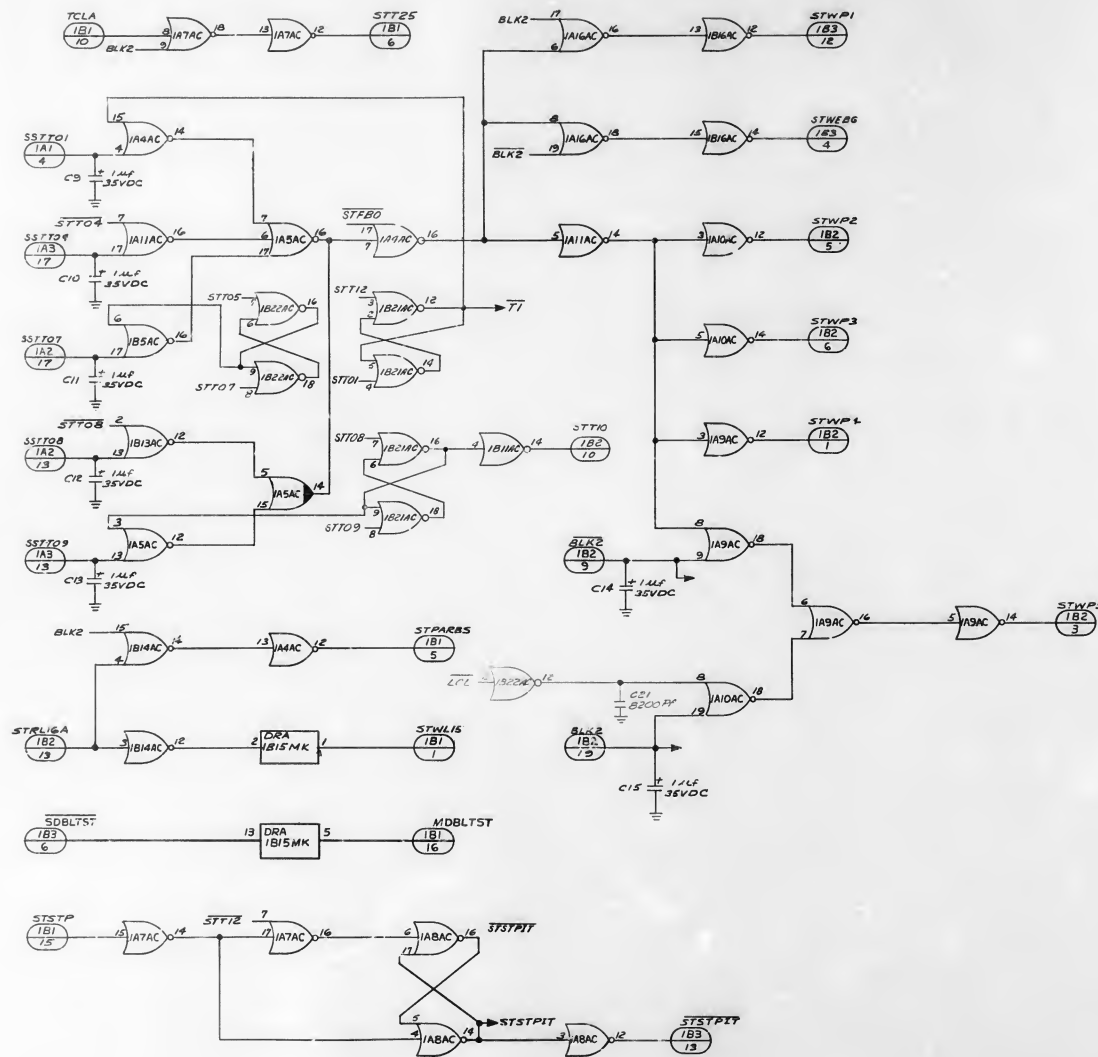
ARTIAL REFERENCE DESIGNATIONS ARE
 GIVEN FOR COMPLETE DESIGNATIONS
 WITH SUB-ASSEMBLY DESIGNATIONS
 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS
 COMBINED BY MIL-D-70327

REFERENCE
1. ASSEMBLY DWG 2014362

| SYMBOL REFERENCE | | |
|------------------|-----------------|------------------|
| KEY CODE | MODULE TYPE | SCHEMATIC NUMBER |
| AC | NOR | 1014036 |
| KH | GATED FLIP FLOP | 1014072 |
| MK | DRIVER MODULE | 1014123 |

| REV STATUS |
|--------------------|
| WIREWRAPE CARD REV |
| |
| |
| |
| |

| | | | |
|---------------------------------|--------------------------|--|-----------------|
| QTY REQD | PART # IDENTIFYING NO | NAME/LOCATION OR DESCRIPTION | PAGE NO. |
| LIST OF MATERIALS | | | |
| BETHLEHEM CO. LEHIGH, MASS. | | MAINED SPACECRAFT CENTER HOUSTON, TEXAS | |
| CONTRACT NO. W53-9-637 | | LOGIC DIAGRAM | |
| CHARTERED BY <u>W53-9-637</u> | | SELF TEST-PLATE I | |
| APPROVED <u>W53-9-637</u> | | COMPUTER TEST SET | |
| PAPER APPROVED <u>W53-9-637</u> | | CODE KEY NO. <u>537</u> | DATA DECLASSIFY |
| MET APPROVED <u>W53-9-637</u> | | 49956 J | 2016447 |
| | | MOBILE NUMBER | NY |
| | | SHEET # OF | |



| | | | |
|--|--|---|--|
| UNITED STATES GOVERNMENT SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DIMENSIONS DECIMALS ANGLES INCHES DECIMALS ANGLES DO NOT SCALE DRAWING INTERNAL | | QTY PART OR IDENTIFYING NO. LIST OF MATERIALS MANUFACTURED BY HUNTER, TEXAS LOGIC DIAGRAM SELF-TEST-PLATE I COMPUTER TEST SET | FRA OR DESCRIPTION 2016447 |
| NEXT ASSY USED ON APPLICATION | DRAWING NO. CONTROL NO. DATE APPROVED SPECIAL APPROVAL NAME APPROVED DATE APPROVED KEY APPROVAL | DRAWING NO. CONTROL NO. DATE APPROVED SPECIAL APPROVAL NAME APPROVED DATE APPROVED KEY APPROVAL | DRAWING NO. CONTROL NO. DATE APPROVED SPECIAL APPROVAL NAME APPROVED DATE APPROVED KEY APPROVAL |

- | NOTE
NUMBER | GENERAL NOTES
DESCRIPTION |
|----------------|--|
| 1 | SHIELD TERMINATION FIGURES ARE PER- A - ND1002011 B - ND1002012 |
| 2 | INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-C-70327. |
| 3 | APPLY LEAD IDENTIFICATIONS PER ND 1002019. OMIT ALL SUFFIX LETTERS EXCEPT A AND B. |
| 4 | DELETED |
| 5 | APPLY REFERENCE DESIGNATIONS TO SLEEVES PER ND 1002019 USING .12 INCH HIGH CHARACTERS. |
| 6 | APPLY LEAD IDENTIFICATION TO SLEEVES OF MULTI-LEADS PER ND1002019 |
| 7 | A LETTER WITH AN ASTERISK SUFFIX INDICATES A LOWER CASE LETTER. |
| 8 | VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING. |
| 9 | ITEM 7 FURNISHED WITH ITEMS 3 AND 5, ITEM 6 WITH ITEM 4. |
| 10 | THE SUFFIX LETTER OF A LEAD IDENTIFICATION IDENTIFIES A SHIELD LEAD, COLOR OR MARKED LETTER. A - FROM END SHIELD L - WHITE WITH BLUE TRACER K - WHITE WITH RED TRACER. B - TO END SHIELD |
| 11 | ASSEMBLE CONTACTS IN SPARE CONNECTOR INSERT HOLES. |
| 12 | IDENTIFY PER MIL-STD-130 (ES267) USING PART NUMBER. |
| 13 | FILL THE SPACE BETWEEN WIRE BUNDLE AND GROMMET USING ITEM 13 TO SECURE WIRE BUNDLE IN STRAIN RELIEF CLAMP |

| | | | | |
|------------|------------|---------|---------------|--|
| SIZE | CODE IDENT | 6900025 | | |
| A | 08974 | | | |
| SCALE-NONE | REV LTR | E | SHEET 2 OF 16 | |

- | NOTE
NUMBER | GENERAL NOTES
DESCRIPTION |
|----------------|---|
| 14 | SECURE TO CABLE USING ITEM 16. MARKING TO READ AWAY FROM CONNECTOR ALIGN CENTER LINES OF BANDS AND MASTER KEY SLOTS TO BE COLLINEAR WITHIN + OR - 0.25 INCH. |
| 15 | MARK IDENTIFICATION BANDS AS NOTED, .12 INCH HIGH, COLOR BLACK PER ND1002019. CENTRALIZE |
| 16 | LOCATE IDENTIFICATION SLEEVE ADJACENT TO SOLDER SLEEVE |
| 17 | SERIALIZE PER ND1002023 |
| 18 | ASSEMBLE PER ND1002032. |
| 19 | SEPARATE GROUNDING STRIP FROM TUBING 4 TO 5 INCHES FROM END. SECURE STRIP STITCHING AND REMOVE FREED BACKING FOIL AS REQUIRED. CUT OFF 2 INCHES OF STRIP AND TERMINATE IN C2-B, E3-B, E5-B AND E7-H RESPECTIVELY. |
| 20 | ZIPPER TUBING SHALL HAVE -Z- TYPE TRACK, WITH .003 + 0 - .001 THICKNESS ALUMINUM FOIL. |

| | | | | |
|------------|------------|---------|---------------|--|
| SIZE | CODE IDENT | 6900025 | | |
| A | 08974 | | | |
| SCALE-NONE | REV LTR | E | SHEET 3 OF 16 | |

- | NOTE
NUMBER | GENERAL NOTES
DESCRIPTION | | | | | | | | | | | | | | | | | | | | |
|----------------|--|-----------------|--------------|-----------------|-------------|--------------|----------------|-----------|-----------|-----------|-----------|----------------|-----------|-----------|-----------|-----------|---------------|-----------|--|--|--|
| | LEAD TOLERANCE CHART | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>LEAD LG</th> <th>JKT STRIP LG</th> <th>SHIELD STRIP LG</th> <th>LEAD CUT LG</th> <th>INS STRIP LG</th> </tr> </thead> <tbody> <tr> <td>UNDER 3 INCHES</td> <td>+ .12-.00</td> <td>+ .06-.06</td> <td>+ .06-.06</td> <td>+ .06-.00</td> </tr> <tr> <td>3 INCH TO 3 FT</td> <td>+ .50-.00</td> <td>+ .25-.25</td> <td>+ .25-.25</td> <td>+ .25-.25</td> </tr> <tr> <td>3 FT TO 10 FT</td> <td>+1.00-.00</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | LEAD LG | JKT STRIP LG | SHIELD STRIP LG | LEAD CUT LG | INS STRIP LG | UNDER 3 INCHES | + .12-.00 | + .06-.06 | + .06-.06 | + .06-.00 | 3 INCH TO 3 FT | + .50-.00 | + .25-.25 | + .25-.25 | + .25-.25 | 3 FT TO 10 FT | +1.00-.00 | | | |
| LEAD LG | JKT STRIP LG | SHIELD STRIP LG | LEAD CUT LG | INS STRIP LG | | | | | | | | | | | | | | | | | |
| UNDER 3 INCHES | + .12-.00 | + .06-.06 | + .06-.06 | + .06-.00 | | | | | | | | | | | | | | | | | |
| 3 INCH TO 3 FT | + .50-.00 | + .25-.25 | + .25-.25 | + .25-.25 | | | | | | | | | | | | | | | | | |
| 3 FT TO 10 FT | +1.00-.00 | | | | | | | | | | | | | | | | | | | | |

| | | | | |
|------------|------------|---------|---------------|--|
| SIZE | CODE IDENT | 6900025 | | |
| A | 08974 | | | |
| SCALE-NONE | REV LTR | E | SHEET 4 OF 16 | |

- | REF NOTE
NUMBER | ITEM | QTY | LIST OF MATERIALS
PART NO. | DESCRIPTION |
|--------------------|------|-----|-------------------------------|--|
| | 1 | 1 | 6900025-001 | WIRE, ND1002181, TYPE 2, CLASS 4, WHT. JKT., 22AWG, WHT/BLU, WHT/RED, 26 FEET TOTAL LENGTH |
| | 2 | 1 | 6900025-002 | WIRE, ND1002181, TYPE 1, CLASS 1, 22AWG, WHT, 305 FEET TOTAL LENGTH |
| | 9 | 1 | 1897249-003 | CONNECTOR PLUG |
| | 9 | 4 | MS3126F-24-61PY | (1897047-613) CONNECTOR PLUG |
| | 9 | 5 | 1897247-001 | CONNECTOR PLUG |
| | 9 | 6 | MS3192A-20A | (1896655-020) CONTACT PINS |
| | 8 | 7 | 1897190- 2 | CONTACT, SOCKET |
| | | E | 1010953- 1 | DELETED |
| | | 5 | 1010763- 3 | DELETED |
| | 8 | 10 | 1010490-228 | INSULATION SLEEVING, ELECT. |
| | 8 | 11 | 1010490-226 | INSULATION SLEEVING, ELECT. |
| | 8 | 12 | 1010763- 2 | SOLDER SLEEVE |
| | 13 | AR | 1901390 | FILLER TAPE |
| | 8 | 14 | 1016128-011 | BAND, IDENTIFICATION |
| | 8 | 15 | 1016128-041 | BAND, IDENTIFICATION |
| | 16 | AR | MIL-T-713 | LACING TAPE TYPE P, CLASS 2, BLACK (ES2732 NO. 18) |

| | | | | |
|------------|------------|---------|---------------|--|
| SIZE | CODE IDENT | 6900025 | | |
| A | 08974 | | | |
| SCALE-NONE | REV LTR | E | SHEET 5 OF 16 | |

| SEE NOTE | | | LIST OF MATERIALS | |
|----------|------|-----|-------------------|---|
| NUMBER | ITEM | QTY | PART NO. | DESCRIPTION |
| 20 | 17 | 1 | 6900025-004 | ZIPPER TUBING PER ND1002155, TYPE III, .625 DIA, 12 FT TOTAL LENGTH. |
| 8 | 1E | 1 | 1016282- 24 | RUBBER GROMMET |
| 8 | 19 | 2 | 1010934-105 | CABLE CLAMP, STRAIGHT |
| 8 | 24 | 2 | 1016282- 18 | RUBBER GROMMET |
| 8 | 21 | 1 | 1015902- 45 | TERMINAL, LUG |
| 8 | 22 | 4 | 1016006-062 | SPLICE REDUCER |
| 8 | 23 | 4 | 1010490-258 | INSULATION, SLEEVING |
| 8 | 24 | 1 | 1010490-232 | INSULATION, SLEEVING |
| 8 | 25 | 2 | 1015902- 49 | TERMINAL, LUG |
| 20 | 26 | 1 | 6900025-004 | WIRE, ND1002181, TYPE 1, CLASS 1, 20 AWG, WHT, 16 INCHES TOTAL LENGTH |

| SIZE | CODE IDENT | | | |
|------------|------------|---------|---|---------------|
| A | 9974 | 6900025 | | |
| SCALE-NONE | | REV LTR | E | SHEET 6 OF 16 |

| LEAD | WIRE | LEAD | CIRCUIT PT | TERM. JKT | SHLD | LEAD | INS | NOTE | ACCESSORY | REMARKS |
|-------|------|------|------------|-----------|-------|------|--------|----------|-----------|-------------|
| IDENT | MATL | LG | FROM (A) | AREA | STRIP | CUT | STRIP | ONE, FIG | ITEMS | |
| ITEM | ITEM | | TO (B) | NO. | LG | LG | LG | TIN | | |
| A | 1 | 1 | | | 2.30 | 2.00 | | B,7 | 10 | |
| | | | | | 2.30 | 2.00 | | A,6A | 12, 10 | SEE NOTE 16 |
| A | 1A | | | DELETED | | | | | | |
| A | 1B | 2 | E1 | | | | .25 NO | | | |
| | | | SHLD A1 | | | | .25 NO | | | |
| A | 1L | | P1-40 | | | | .15 NO | | 7 | |
| | | | P2-M* | | | | .22 NO | | 6 | |
| A | 1R | | P1-38 | | | | .15 NO | | 7 | |
| | | | P2-K* | | | | .22 NO | | 6 | |
| A | 2 | 1 | | | 2.30 | 2.00 | | B,7 | 10 | |
| | | | | | 2.30 | 2.00 | | A,6A | 12, 10 | SEE NOTE 16 |
| A | 2A | | | DELETED | | | | | | |
| A | 2B | 2 | E1 | | | | .25 NO | | | |
| | | | SHLD A2 | | | | .25 NO | | | |
| A | 2L | | P1-4 | | | | .15 NO | | 7 | |
| | | | P2-P* | | | | .22 NO | | 6 | |
| A | 2R | | P1-5 | | | | .15 NO | | 7 | |
| | | | P2-N* | | | | .22 NO | | 6 | |
| A | 3 | 1 | | | 2.30 | 2.00 | | B,7 | 10 | |
| | | | | | 2.30 | 2.00 | | A,6A | 12, 10 | SEE NOTE 16 |
| A | 3A | | | DELETED | | | | | | |

| SIZE | CODE IDENT | | | |
|------------|------------|---------|---|---------------|
| A | 9974 | 6900025 | | |
| SCALE-NONE | | REV LTR | E | SHEET 7 OF 16 |

| LEAD | WIRE | LEAD | CIRCUIT PT | TERM. JKT | SHLD | LEAD | INS | NOTE | ACCESSORY | REMARKS |
|-------|------|------|------------|-----------|-------|------|--------|----------|-----------|-------------|
| IDENT | MATL | LG | FROM (A) | AREA | STRIP | CUT | STRIP | ONE, FIG | ITEMS | |
| ITEM | ITEM | | TO (B) | NO. | LG | LG | LG | TIN | | |
| A | 3B | 2 | E1 | | | | .25 NO | | | |
| | | | SHLD A3 | | | | .25 NO | | | |
| A | 3L | | P1-63 | | | | .15 NO | | 7 | |
| | | | P2-K* | | | | .22 NO | | 6 | |
| A | 3R | | P1-62 | | | | .15 NO | | 7 | |
| | | | P2-C* | | | | .22 NO | | 6 | |
| A | 4 | 1 | | | 2.30 | 2.00 | | B,7 | 10 | |
| | | | | | 2.30 | 2.00 | | A,6A | 12, 10 | SEE NOTE 16 |
| A | 4A | | | DELETED | | | | | | |
| A | 4B | 2 | E1 | | | | .25 NO | | | |
| | | | SHLD A4 | | | | .25 NO | | | |
| A | 4L | | P1-65 | | | | .15 NO | | 7 | |
| | | | P2-T* | | | | .22 NO | | 6 | |
| A | 4R | | P1-64 | | | | .15 NO | | 7 | |
| | | | P2-S* | | | | .22 NO | | 6 | |
| A | 5 | 2 | E1 | | | | .25 NO | | | |
| | | | P2-M | | | | .22 NO | | 6 | |
| A | 6 | 2 | P1-32 | | | | .15 NO | | 7 | |
| | | | P3-32 | | | | .15 NO | | 7 | |
| A | 7 | | | DELETED | | | | | | |
| A | 8 | 2 | P1-14 | | | | .15 NO | | 7 | |
| | | | P1-14 | | | | .15 NO | | 7 | |

| SIZE | CODE IDENT | | | |
|------------|------------|---------|---|---------------|
| A | 9974 | 6900025 | | |
| SCALE-NONE | | REV LTR | E | SHEET 8 OF 16 |

| LEAD | WIRE | LEAD | CIRCUIT PT | TERM. JKT | SHLD | LEAD | INS | NOTE | ACCESSORY | REMARKS |
|-------|------|------|------------|-----------|-------|------|--------|----------|-----------|---------|
| IDENT | MATL | LG | FROM (A) | AREA | STRIP | CUT | STRIP | ONE, FIG | ITEMS | |
| ITEM | ITEM | | TO (B) | NO. | LG | LG | LG | TIN | | |
| A | 9 | 2 | P1-81 | | | | .15 NO | | 7 | |
| | | | P2-LL | | | | .22 NO | | 6 | |
| A | 10 | 2 | P1-82 | | | | .15 NO | | 7 | |
| | | | P2-KK | | | | .22 NO | | 6 | |
| A | 11 | 2 | P1-80 | | | | .15 NO | | 7 | |
| | | | P2-JJ | | | | .22 NO | | 6 | |
| A | 12 | 2 | P1-35 | | | | .15 NO | | 7 | |
| | | | P2-HH | | | | .22 NO | | 6 | |
| A | 13 | 2 | P1-59 | | | | .15 NO | | 7 | |
| | | | P2-GG | | | | .22 NO | | 6 | |
| A | 14 | 2 | P1-58 | | | | .15 NO | | 7 | |
| | | | P2-FF | | | | .22 NO | | 6 | |
| A | 15 | 2 | P1-36 | | | | .15 NO | | 7 | |
| | | | P2-N | | | | .22 NO | | 6 | |
| A | 16 | 2 | P1-85 | | | | .15 NO | | 7 | |
| | | | P2-P | | | | .22 NO | | 6 | |
| A | 17 | 2 | P1-60 | | | | .15 NO | | 7 | |
| | | | P2-R | | | | .22 NO | | 6 | |
| A | 18 | 2 | P1-37 | | | | .15 NO | | 7 | |
| | | | P2-S | | | | .22 NO | | 6 | |
| A | 19 | 2 | P1-19 | | | | .15 NO | | 7 | |
| | | | P2-T | | | | .22 NO | | 6 | |
| A | 20 | 2 | P1-61 | | | | .15 NO | | 7 | |
| | | | P2-U | | | | .22 NO | | 6 | |

| SIZE | CODE IDENT | | | |
|------------|------------|---------|---|---------------|
| A | 9974 | 6900025 | | |
| SCALE-NONE | | REV LTR | E | SHEET 9 OF 16 |

| LEAD IDENT | WIRE MATERIAL ITEM | LEAD LG | CIRCUIT PT FROM (A) TO (B) | TERM. JKT AREA LG | SHLD STRIP LG | LEAD STRIP LG | CUT LG | INS STRIP LG | TIN | NOTE ONE, FIG | ACCESSORY ITEMS | REMARKS |
|---------------|--------------------------|------------|----------------------------------|----------------------|------------------|------------------|-----------|------------------|--------|---------------------|--------------------|---------|
| A 21 | 2 | | P1-56 P2-EE | | | | | .15 NO .22 NO | 7 6 | | | |
| A 22 | 2 | | P1-16 P2-UC | | | | | .15 NO .22 NO | 7 6 | | | |
| A 23 | 2 | | P1-33 P2-CC | | | | | .15 NO .22 NO | 7 6 | | | |
| A 24 | 2 | | P1-34 P2-BE | | | | | .15 NO .22 NO | 7 6 | | | |
| A 25 | 2 | | P1-6 P2-AA | | | | | .15 NO .22 NO | 7 6 | | | |
| A 26 | 2 | | P1-17 P2-Z* | | | | | .15 NO .22 NO | 7 6 | | | |
| A 27 | 2 | | P1-54 P2-Y* | | | | | .15 NO .22 NO | 7 6 | | | |
| A 28 | 2 | | P1-53 P2-X* | | | | | .15 NO .22 NO | 7 6 | | | |
| A 29 | 2 | | P1-55 P2-W* | | | | | .15 NO .22 NO | 7 6 | | | |
| A 30 | 2 | | P1-2 P3-2 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 31 | 2 | | P1-9 P3-9 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 32 | 2 | | P1-22 P3-22 | | | | | .15 NO .15 NO | 7 7 | | | |

| | | |
|------------|------------|---------|
| SIZE | CODE IDENT | |
| A | NO 9974 | 6900025 |
| SCALE-NONE | REV LTR | E |
| SHEET | 10 OF | 16 |

| LEAD IDENT | WIRE MATERIAL ITEM | LEAD LG | CIRCUIT PT FROM (A) TO (B) | TERM. JKT AREA LG | SHLD STRIP LG | LEAD STRIP LG | CUT LG | INS STRIP LG | TIN | NOTE ONE, FIG | ACCESSORY ITEMS | REMARKS |
|---------------|--------------------------|------------|----------------------------------|----------------------|------------------|------------------|-----------|------------------|--------|---------------------|--------------------|---------|
| A 33 | 2 | | P1-41 P3-41 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 34 | 2 | | P1-66 P3-66 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 35 | 2 | | P1-3 P3-3 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 36 | 2 | | P1-10 P3-10 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 37 | 2 | | P1-23 P3-23 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 38 | 2 | | P1-42 P3-42 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 39 | 2 | | P1-67 P3-67 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 40 | 2 | | P1-12 P3-12 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 41 | 2 | | P1-11 P3-11 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 42 | 2 | | P1-24 P3-24 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 43 | 2 | | P1-43 P3-43 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 44 | 2 | | P1-68 P3-68 | | | | | .15 NO .15 NO | 7 7 | | | |

| | | |
|------------|------------|---------|
| SIZE | CODE IDENT | |
| A | NO 9974 | 6900025 |
| SCALE-NONE | REV LTR | E |
| SHEET | 11 OF | 16 |

| LEAD IDENT | WIRE MATERIAL ITEM | LEAD LG | CIRCUIT PT FROM (A) TO (B) | TERM. JKT AREA LG | SHLD STRIP LG | LEAD STRIP LG | CUT LG | INS STRIP LG | TIN | NOTE ONE, FIG | ACCESSORY ITEMS | REMARKS |
|---------------|--------------------------|------------|----------------------------------|----------------------|------------------|------------------|-----------|------------------|--------|---------------------|--------------------|---------|
| A 45 | 2 | | P1-51 P3-51 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 46 | 2 | | P1-78 P3-78 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 47 | 2 | | P1-77 P3-77 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 48 | 2 | | P1-76 P3-76 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 49 | 2 | | P1-79 P3-79 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 50 | 2 | | P1-49 P3-49 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 51 | 2 | | P1-30 P3-30 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 52 | 2 | | P1-48 P3-48 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 53 | 2 | | P1-26 P3-26 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 54 | 2 | | P1-25 P3-25 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 55 | 2 | | P1-1 P3-1 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 56 | 2 | | P1-21 P3-21 | | | | | .15 NO .15 NO | 7 7 | | | |

| | | |
|------------|------------|---------|
| SIZE | CODE IDENT | |
| A | NO 9974 | 6900025 |
| SCALE-NONE | REV LTR | E |
| SHEET | 12 OF | 16 |

| LEAD IDENT | WIRE MATERIAL ITEM | LEAD LG | CIRCUIT PT FROM (A) TO (B) | TERM. JKT AREA LG | SHLD STRIP LG | LEAD STRIP LG | CUT LG | INS STRIP LG | TIN | NOTE ONE, FIG | ACCESSORY ITEMS | REMARKS |
|---------------|--------------------------|------------|----------------------------------|----------------------|------------------|------------------|-----------|------------------|--------|---------------------|--------------------|---------|
| A 57 | 2 | | P1-8 P3-8 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 58 | 2 | | P1-83 P3-83 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 59 | 2 | | P1-84 P3-84 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 60 | 2 | | P1-31 P3-31 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 61 | 2 | | P1-57 P3-57 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 62 | 2 | | P1-72 P3-72 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 63 | 2 | | P1-70 P3-70 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 64 | 2 | | P1-26 P3-26 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 65 | 2 | | P1-44 P3-44 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 66 | 2 | | P1-18 P3-18 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 67 | 2 | | P1-69 P3-69 | | | | | .15 NO .15 NO | 7 7 | | | |
| A 68 | 2 | | P1-47 P3-47 | | | | | .15 NO .15 NO | 7 7 | | | |

| | | |
|------------|------------|---------|
| SIZE | CODE IDENT | |
| A | NO 9974 | 6900025 |
| SCALE-NONE | REV LTR | E |
| SHEET | 13 OF | 16 |

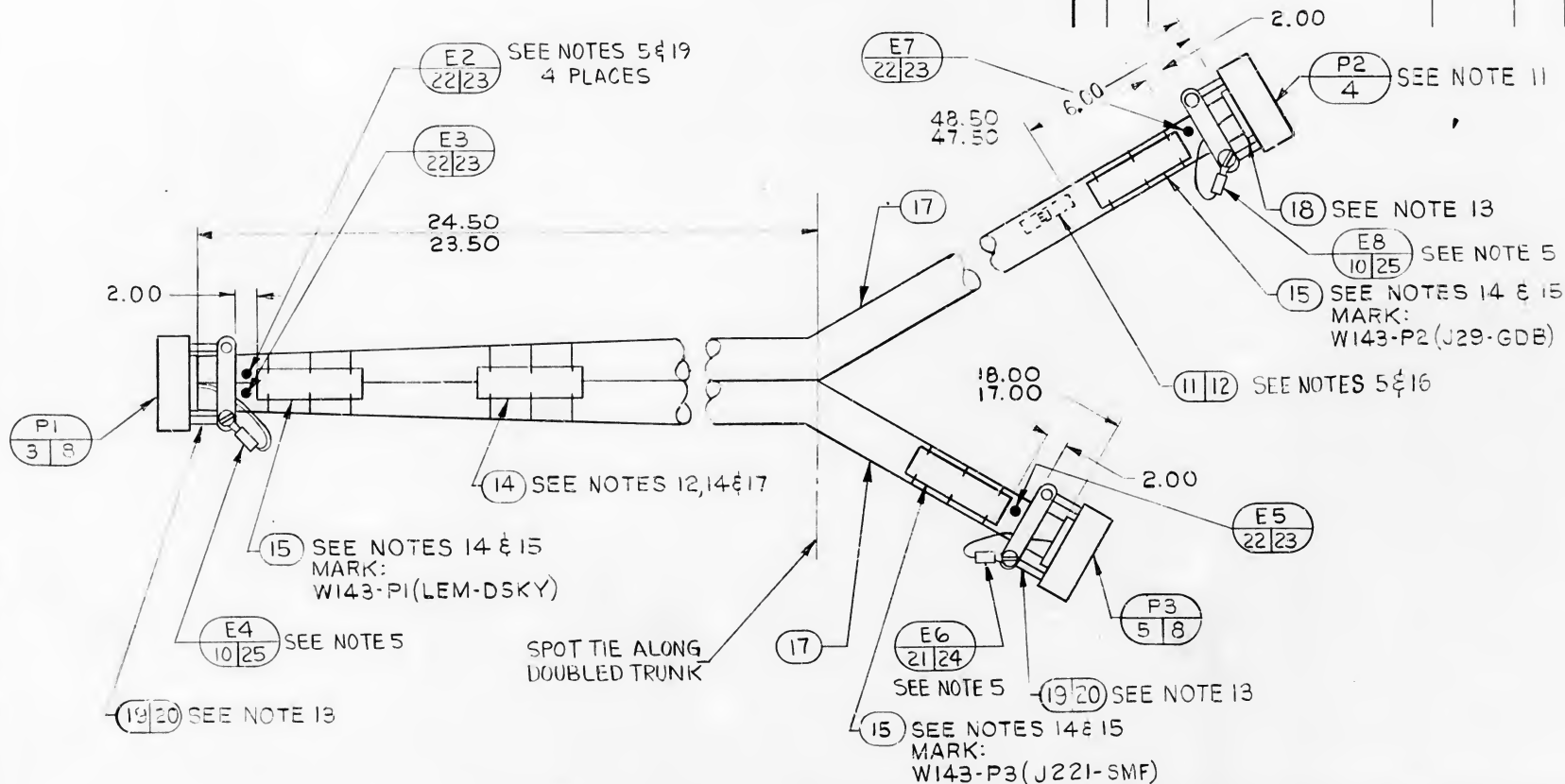
| LEAD IDENT | WIRE MATERIAL ITEM | LEAD LG | CIRCUIT PT FROM (A) TO (B) | TERM. JKT AREA NO. | SHLD STRIP LG | LEAD CUT LG | INS STRIP LG | NOTE ONE, FIG | ACCESSORY ITEMS | REMARKS |
|---------------|--------------------------|------------|----------------------------------|--------------------------|---------------------|-------------------|--------------------|---------------------|--------------------|---------|
| A | 69 | 2 | P1-46 P3-46 | | | | .15 NO .15 NO | | 7 | |
| A | 70 | 2 | P1-71 P3-71 | | | | .15 NO .15 NO | | 7 | |
| A | 71 | 2 | P1-27 P3-27 | | | | .15 NO .15 NO | | 7 | |
| A | 72 | 2 | P1-45 P3-45 | | | | .15 NO .15 NO | | 7 | |
| A | 73 | 2 | P1-7 P3-7 | | | | .15 NO .15 NO | | 7 | |
| A | 74 | 2 | P1-73 P3-73 | | | | .15 NO .15 NO | | 7 | |
| A | 75 | 2 | P1-75 P3-75 | | | | .15 NO .15 NO | | 7 | |
| A | 76 | 2 | P1-13 P3-13 | | | | .15 NO .15 NO | | 7 | |
| A | 77 | 2 | P1-74 P3-74 | | | | .15 NO .15 NO | | 7 | |
| A | 78 | 2 | F2-BB E4 | | | | .38 NO .16 NO | | | |
| A | 79 | 2 | E3-BE E4 | | | | .38 NO .16 NO | | | |
| A | 80 | 26 | E7-BE E8 | | | | .38 NO .16 NO | | | |

| | | | | |
|------------|------------|---------|-------|----------|
| SIZE | CODE IDENT | 6900025 | | |
| A | NO 9974 | | | |
| SCALE-NONE | REV LTR | E | SHEET | 14 OF 16 |

| LEAD IDENT | WIRE MATERIAL ITEM | LEAD LG | CIRCUIT PT FROM (A) TO (B) | TERM. JKT AREA NO. | SHLD STRIP LG | LEAD CUT LG | INS STRIP LG | NOTE ONE, FIG | ACCESSORY ITEMS | REMARKS |
|---------------|--------------------------|------------|----------------------------------|--------------------------|---------------------|-------------------|--------------------|---------------------|--------------------|---------|
| A | 81 | 26 | ES-BB E6 | | | | .38 NO .16 NO | | | |

| | | | | |
|------------|------------|---------|-------|----------|
| SIZE | CODE IDENT | 6900025 | | |
| A | NO 9974 | | | |
| SCALE-NONE | REV LTR | E | SHEET | 15 OF 16 |

REVISIONS TDRR 23807

SEE SHEET 1
FOR REVISION RECORD

| | | | | | |
|---|--|---|--|---|--|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON | | PC ELECTRONICS DIVISION | | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | |
| | | FRACTIONS DECIMALS ANGLES + - +.50 + - | | DRAWN BY <i>W. L. H. 11/19/65</i> DATE <i>4 AUG 65</i> CHECKED BY <i>W. L. H. 11/19/65</i> APPROVAL <i>E. L. H. 11/19/65</i> APPROVAL <i>W. L. H. 11/19/65</i> | |
| DO NOT SCALE THIS DRAWING | | NASA APPROVAL <i>W. L. H. 11/19/65</i> | | CODE IDENT NO. SIZE 99974 C | |
| MATERIAL | | MIT APPROVAL <i>W. L. H. 11/19/65</i> | | SCALE NONE | |
| 6900043-011 1900030 NEXT ASSY USED ON | | CONTRACT NAS 9-497 | | 6900025 | |
| APPLICATION | | | | SHEET 16 OF 16 | |

SUBSYSTEM Computer
DESCRIPTION

ASSY.

Cable connections for GSE used during CSS test

| Rev. | Date | TDRR NO. | PAGES REVISED | APPROVAL | REFERENCES |
|------|----------|----------|---------------|----------|------------|
| Let. | | | JDC D.S. | MIT NASA | |
| A | 10-13-66 | 31502 | 1,3 | - | EA |
| B | 1-12-67 | 32648 | 1 | - | EA |
| C | 9-7-67 | 34514 | 1 | - | EA |
| D | 3-29-68 | 35991 | 1,3 | - | EA |
| E | 9-26-68 | 36862 | 1 | - | EA |
| F | 10-17-68 | 36905 | 2 | - | EA |

IMPORTANT

Refer to JDC 18100 for lubrication instructions prior to engaging any screw or bolt into header helicoil inserts, and for helicoil insert cleaning instructions after all testing has been completed or prior to spacecraft installation.

1. Connect the Subsystem Test Interconnection Set (Drawing No. 2014265) as shown on figure 1.

NOTE: Omit steps 2 and 3 if an Auxiliary Calibration Console (2014059) is being used and connect cable W259 to Auxiliary Calibration System as follows:

a. Connect plug P1 to J2

(UUT) on Signal Interface

Panel.

b. Connect plug P2 to SIGNAL HI jack on Digital Ohmmeter.

c. Connect plug P3 to SIGNAL LO jack on Digital Ohmmeter.

d. Plugs P7 and P8 are not connected at this time.

2. Connect cable W259 to the AGC Calibration System as follows:

a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

SUBSYSTEM Computer

ASSY

- Connect plug P2 to the SIGNAL HI jack on the Digital Ohmmeter.
- Connect plug P3 to the SIGNAL LO jack on the Digital Ohmmeter.
- Connect the antenna cable to the jack located on top of the AGC Calibration System.
- On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:
 - Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.
 - Connect cable W243 from the CNTR B jack to the STOP B jack on the Frequency Counter.
 - Connect cable W245 from the SCOPE A jack to the channel A 1 MEG Jack on the Oscilloscope.
 - Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.
 - Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.
 - Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.
 - Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

- Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.
 - Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.
 - Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.
 - Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.
 - Connect cable W253 from the B jack to the DAB jack on the Self Test panel.
- NOTE: Perform step 5 only if an auxiliary calibration console (2014059) is being used.
- Connect cable W241 (P/N 2014080-171) between J1 (time base) of auxiliary calibration console and the 1 mc standard signal outlet.

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SUBSYSTEM Computer

ASSY

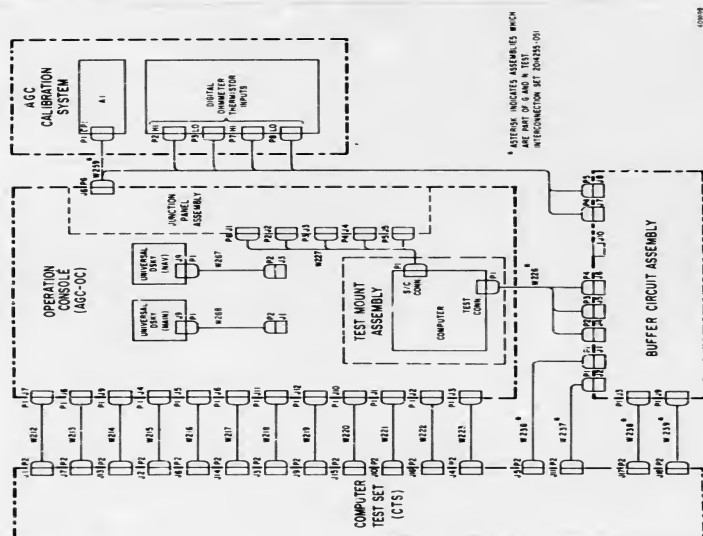


Figure 1. Subsystem Test Interconnections

DATE 12 APR 66

J08 JUMPER MODULES - BLOCK II AND LEM

JDC 05416 REV. A PAGE 1 OF 2
INITIAL TORR 27956 D.S. PGS 0

SUBSYSTEM Computer

DESCRIPTION

ASSY.

Installation and removal of fixed memory rope and jumper modules in the computer

[illegible]

IMPORTANT

Refer to JDC 18100 for lubrication. Instructions prior to engaging any screw or bolt into header helicoil inserts, and for helicoil insert cleaning instructions after all testing has been completed or prior to spacecraft installation.

INSTALLATION

NOTE: Fixed memory module to be operative must be installed in pairs or ropes. If one module is to be used then a jumper module must be used. Refer to table page 2.

1. Inspect the connector of the module for bent or broken pins.
2. Refer to the diagram on the second page of this JDC. Insert the module in the computer.

3. Alternating on the jacking screws tighten them with a torque wrench one turn each until they are 15 to 19 inch-pounds.

REMOVAL

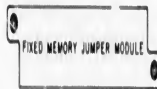
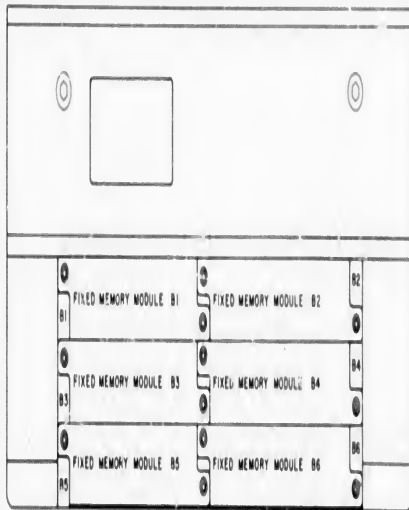
4. Remove modules using the torque wrench fitted with a 5/32" Allen adapter. Alternate each module jacking screw so that module is withdrawn straight from computer.

JOB JUMPER MODULES - BLOCK II AND LEM

JDC 05416 REV A PAGE 2 OF 2

SUBSYSTEM Computer

ASSV



| ASPE | MODULE | REFERENCE DESIGNATION |
|------|--------|-----------------------|
| A | B1 | A1 |
| | B2 | A2 |
| B | B3 | B1 |
| | B4 | B2 |
| T | B5 | T1 |
| | B6 | T2 |

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DATE 12 APR 66

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

SUBSYSTEM Computer
DESCRIPTION

ASSY.

Procedure for installing and removing the computer (with handling fixture) in the Operation Console

| Rev. | Date | TDRR NO. | PAGES | REVISED | JDC | D.S. | MIT | NASA | REFERENCES |
|---|----------|----------|-------|---------|-----|------|-------|------|--|
| A | 10-31-66 | 31503 | All | - | - | - | EA 20 | - | GSE Cabling Instructions, JDC 05415; NASA Drawing No. 2016402; AGC Handling Fixture, JDC 05111 and JDC 05121 |
| B | 10-30-67 | 34036 | All | - | - | - | EA 20 | - | IMPORTANT See below. |
| C | 10-20-67 | 34889 | All | - | - | - | EA 20 | - | |
| D | 4-25-68 | 36125 | All | - | - | - | EA 20 | - | |
| E | 9-26-68 | 36862 | 1 | - | - | - | EA 20 | - | |
| INTERVAL | | | | | | | | | |
| TOOLS AND MATERIAL | | | | | | | | | |
| Torque wrench, 0-25 inch-pounds; Multimeter, Simpson 260 or equivalent | | | | | | | | | |

IMPORTANT

Installation and removal of the computer in the Operation Console requires two men. Refer to JDC 18100 for lubrication instructions prior to engaging any screw or bolt into header helicoil inserts, and for helicoil insert cleaning instructions after all testing has been completed or prior to spacecraft installation.

INSTALLATION

1. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

2. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

VERIFICATION WITH SIOL REQUIRED BEFORE USE

DATE 12 APR 66

3. Disconnect and remove W226 cable from the Buffer Circuit Assembly, and W227 from the Operation Console AGC Junction. (Refer to JDC 05415.)

4. Unlock and slide the Test Mount Drawer Assembly all the way out.

5. Remove the AGC Handling Fixture reinforcing plate from the computer, referencing JDC 05111, or, if protective cover is installed, reference JDC 05121.

6. With one man at each AGC Handling Fixture sling handle, lift and place the computer on the Test Mount Drawer Assembly.

7. Center the computer on the drawer assembly with the connector end of the computer to the front of the assembly.

8. Attach ground strap Part No. 2014457-051 between E6 of the Operation Console

SUBSYSTEM Computer

ASSY

coldplate and a screw storage hole in the AGC Handling Fixture sling handle. Insure that the screw does not bottom out against the computer.

9. Remove the protective cover from the computer interface connector J1 (A51) and retain the cover and hardware.

9A. Carefully remove the protective cover assembly (2003099) from the test connector (A52). Turn each screw 1/2 turn at a time to insure even release of the connector cover and to avoid bending the Malco pins.

CAUTION: Sore the test connector cover assembly safely so that the Malco pins will not be accidentally broken or bent.

10. Refer to GSE Cabling Instructions JDC 05415. Connect W226 and W227 cables to the computer.

11. Release the slide lock devices and slide the test mount drawer in as far as it will go. Lock the drawer in.

11A. Refer to JDC 05415. Connect W226 cable to the Buffer Circuit Assembly and W227 cable to the Operation Console AGC Junction.

12. Using a multimeter, measure the resistance between the computer case and the 0 VDC return line terminal E1 on the 28 VDC power supply of the Operation Console. Resistance NMT 2 ohms. Record on data sheet.

13. Refer to NASA Drawing No. 2016402. Insure ground strap Part No. 2014457-041

is installed between E6 of the Operation Console coldplate and E1 of the Buffer Circuit Assembly.

REMOVAL

14. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

15. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

16. Disconnect W226 cable from the Buffer Circuit Assembly and W227 cable from the Operation Console AGC Junction.

17. Unlock and slide Test Mount Drawer Assembly all the way out.

18. Disconnect and remove W226 and W227 cables from computer.

19. Deleted.

19A. Remove ground strap Part No. 2014457-051 from the screw storage hole in the AGC Handling Fixture sling handle.

20. Install the protective cover on the computer J1 (A51) interface connector.

20A. Check the test connector cover assembly for bent pins prior to replacement. Replace the cover assembly on the test connector turning each captive screw 1/2 turn at a time. Torque all four screws to 18-22 inch-pounds.

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SUBSYSTEM Computer

ASSY

21. With one man at each AGC Handling Fixture sling handle, lift the computer off the Test Mount Drawer Assembly.

CAUTION: Do not use AGC Handling Fixture (2014282-021) for shipment or during pressure testing of AGC. Prevent bowing of AGC tray A during shipment or pressure testing by using AGC Handling Fixture (2014282-031).

NOTE: If AGC Handling Fixture (2014282-031) is to be utilized, install the reinforcing plate (2016461) on the computer per JDC 05111. If the AGC Handling Fixture (2014282-021) is to be utilized, perform step 21A.

21A. Place protective cover on the bottom of the computer snapping it in place on the AGC Handling Assembly.

22. Place the computer on the computer shelf of the G&N transportation cart.

23. Release the slide lock on the Test Mount Drawer and slide drawer in as far as it will go. Lock the drawer in.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05417
REV E
INITIAL TDRR 27956

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

| ASSEMBLY UNDER TEST | | | TEST HISTORY | | |
|--------------------------------|----------|------------------|--------------|-----------------|------------------|
| TITLE | DATE | START | END | SITE / LOCATION | |
| SER. NO. | DWG. | REV. | TIME | START | END |
| TOTAL ELAPSED | | | | | |
| MAJOR GROUND SUPPORT EQUIPMENT | | | | | |
| NAME | SER. NO. | CAL. DATE | | | |
| NAME | SER. NO. | CAL. DATE | | | |
| CONDUCTED BY | | NAME/AFFILIATION | APPROVED BY | | NAME/AFFILIATION |

| Step | Parameter | Specification | Results |
|------|------------|---------------|---------|
| 12 | Resistance | NMT 2 ohms | |

DATE 12 APR 66

DATE 12 APR 66

ASSY.

DATE 12 APR 66

ASSY

- c. Set the AGC CURRENT switch to the OFF position.
 - d. Set the DSKY KEYBOARD VOLTAGE switch to the OFF position.
 - e. Set the UNIVERSAL DSKY DIMMERS MAIN REGISTER, NAV REGISTER, MAIN-NAV ALARMS, MAIN-NAV KEYBOARDS controls fully counter-clockwise.
 - f. Set the DCVM switch to the 40V position.
 - g. Set the DCVM MONITOR switch to the ZERO position.
14. On the Power Supply 5 VDC panel of the Operation Console:
- a. Set the POWER switch to the ON position.
 - b. Set the regulator switch to the VOLTAGE REGULATED position.
15. On the Power Supply 28 VDC panel of the Operation Console:
- a. Set the POWER switch to the ON position.
 - b. Set the regulator switch to the VOLTAGE REGULATED position.
16. On the 115 VAC 400 cycle Power Supply panel of the Operation Console:
- a. Set the INVERTER switch to the ON position.
 - b. Set the AGC circuit breaker to the ON position.
17. On the Power Supply 28 VDC panel of the 115 VAC 400 cycle Power Supply panel of the Operation Console:
- a. Set the POWER switch to the ON position.

DATE 12 APR 66

25. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the ON position.

DATE 12 APR 66

DATE 12 APR 66

h. Depress and release MAIN DSKY ALARM-KB ON annunciator. Observe that annunciator illuminates.

c. Depress and release AGC OFF annunciator.

DATE 12 APR 66

b. Set the STATION switch to the OFF position.

| Step | Parameter | Specification | Results |
|-------|-------------------------|----------------------|---------|
| 9. a | CTS 3V Voltage | 4.60 ± 0.30 vdc | _____ |
| 9. b | CTS 10V Voltage | 10.00 ± 0.20 vdc | _____ |
| 10. c | AGC -28V Voltage | 28.0 ± 0.5 vdc | _____ |
| 10. e | AGC -28VA Voltage | 28.0 ± 1.0 vdc | _____ |
| 10. f | AGC -28VB Voltage | 28.0 ± 1.1 vdc | _____ |
| 10. g | 5A Current | NMT 4.5 amperes | _____ |
| 10. j | 140V Voltage | Minimum indication | _____ |
| 11. a | AGC (+4) +3V Voltage | 4.0 ± 0.5 vdc | _____ |
| 11. b | AGC (+14V) +13V Voltage | 14.0 ± 1.0 vdc | _____ |

JDC 05772 REV. - PAGE 1 OF 1
INITIAL TDRR 32809 D.S. PGS C

ASSY. Block II-C Computer

| Rev. Let. | Date | TD/R NO. | PAGES REVISED | | APPROVAL | | REFERENCES |
|-----------|------|----------|---------------|-------|----------|------|-----------------------|
| | | | JDC | D. S. | MIT | NASA | |
| | | | | | | | JDC 05771 |
| | | | | | | | ND's 1021042, 1021043 |
| | | | | | | | IMPORTANT |
| | | | | | | | INTERVAL |
| | | | | | | | As required |
| | | | | | | | TOOLS AND MATERIAL |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

DATE _____

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalars, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scalar test. The first section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

| Rev. Let. | Date | TDRR NO. | PAGES REVISED | JDC | D.S. | APPROVAL | REFERENCES |
|-----------|----------|----------|------------------|-----|------|----------|--|
| A | 4-20-67 | 33026 | 1 | | | EA | JDC's 05406, 05407, 05412, 05413, 05414, 05403 |
| B | 10-12-67 | 34894 | 2, 4, 16, 18, 20 | | 8 | EA | ND's 1021042, 1021043 |
| C | 10-20-67 | 34887 | 1, 11-16, 18 | | | EA | IMPORTANT |
| D | 3-29-68 | 35992 | 1, 2, 4 | | 1 | EA | |
| E | 10-17-68 | 36906 | 4 | | | EA | |
| F | 3-5-69 | 37354 | 16 | | | EA | |

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.
2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

- a. Set the CHANNEL T switches to position 211.

- b. Set the FREQ + PHASE switch to the FRT T -S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel to A20 Panel
CNTR-A Jack CNTR-A Jack

Frequency Counter to A20 Panel

FREQ A - DC Jack CNTR-A Jack

5. On the FREQUENCY COUNTER set: FUNCTION switch to PERIOD A
FREQ-TIME switch to μ S
DISPLAY control to ∞
TRIGGER LEVEL vernier for display of 312.5 \pm 1.0.

6. Set CHANNEL T switches to position 212, and set the FREQUENCY COUNTER FUNCTION switch to the PERIOD A position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 00000.0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).
10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scalar count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scalar continuity during standby.

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).
12. Press the MONITOR indicator switch to the on (illuminated) position.
13. Press the CL Key.
14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.
15. Set the T12 COUNTER STOP switch to the OFF position.
16. Set the INHIBIT INCREMENTS switch to the OFF position.
17. Press the PROCEED button.
18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

- a. FREQUENCY COUNTER is counting.
 - b. DSKY Register 1 displays 24-4.
 - c. DSKY Registers 2 and 3 are blank.
19. Hold down the DSKY PRO (STBY) Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the PRO (STBY) Key has been depressed.)
 20. Set the T12 COUNTER STOP switch to the ON position.
 21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

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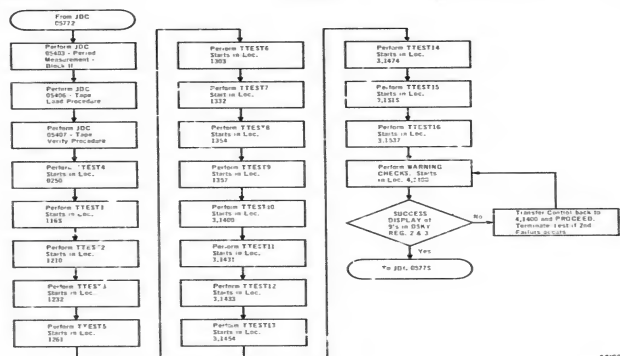


Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

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22. Depress and hold the DSKY PRO (STBY) Key for a minimum of three seconds or until the STBY indicator extinguishes, whichever occurs first. If STBY does not extinguish, release and depress again, up to a maximum of three times (RESTART may illuminate). Record on Data Sheet, number of times DSKY PRO (STBY) Key was depressed.

- A. On the CTS:
Depress FRESH START
Depress PROCEED
Depress ALARM RESET
- B. Depress RESET KEY on DSKY.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.
24. Press the MONITOR indicator switch to the on (illuminated) position.
25. Press the CL Key.
26. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.
27. Press the PROCEED button.
28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.
29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.
30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of the test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.
31. Compare results of steps 23 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program re-triggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.
33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).
34. Press the MONITOR indicator switch to the on (illuminated) position.
35. Press the CL Key.
36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.
37. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.
38. Press the PROCEED button.

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39. Verify the following events:
- DSKY Register 1 displays 24-1.
 - The FREQUENCY COUNTER is counting.
 - DSKY Registers 2 and 3 are blank.
- Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. The octal 37 is equal to decimal 31. Immediately after Channel 4 reaches the 32nd count, the program re-triggers the external clock, halts the time counter, and sets up the number 10 (0010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER

with the number displayed (00010) by the DSKY and verifying agreement within ± 2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

- DSKY Register 1 displays 24-2.
- The FREQUENCY COUNTER is counting.
- DSKY Registers 2 and 3 are blank.

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ± 2 counts in the least significant counter position. Stamp data sheet.

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TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register 1, and enters a negative 1 into location 0075 to be indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above, except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ± 2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

- DSKY Register 1 displays 24-3.
- The FREQUENCY COUNTER is counting.
- DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

- Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

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b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop. This time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

71. Press the PROCEED button.

72. Verify the following events:

- DSKY Register 1 displays a 1 in position 3.
 - The FREQUENCY COUNTER is counting.
 - DSKY Registers 2 and 3 are blank.
- Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830, 0 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME 2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

- Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.
- Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.
- Deposits a count of 1 into the TIME 2 Counter.

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d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If a positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163,830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (Registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch

and the INHIBIT INCREMENTS switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

- DSKY Register 1 displays a 2 in position 3.
 - The FREQUENCY COUNTER is counting.
 - DSKY Registers 2 and 3 are blank.
- Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830, 0 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through full scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

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| <p>All three tests utilize a common routine which clears the DSKY display, starts the external counter after 11.0 detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Register 2 and 3. The common routine is tied into each test by initialization procedures which set the Index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.</p> <p>a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)</p> <p>b. Deposits positive zero into the TIME Counter under test.</p> <p>c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.</p> <p>d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.</p> <p>e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163,830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position.</p> | | <p>87. Set the T12 COUNTER STOP switch to the ON position.</p> <p>88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).</p> <p>89. Press the MONITOR indicator switch to the on (illuminated) position.</p> <p>90. Press the CL Key.</p> <p>91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.</p> <p>92. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.</p> <p>93. Press the PROCEED button.</p> <p>94. Verify the following events:</p> <p>a. DSKY Register 1 displays a 3 in position 3.</p> <p>b. The FREQUENCY COUNTER is counting.</p> <p>c. DSKY Registers 2 and 3 are blank. Stamp data sheet.</p> <p>95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.</p> <p>96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.</p> <p>97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ± 2 counts in the least significant counter position. Stamp data sheet.</p> |

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| <p>109. Set the T12 COUNTER STOP switch to the ON position.</p> <p>110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).</p> <p>111. Press the MONITOR indicator switch to the on (illuminated) position.</p> <p>112. Press the CL Key.</p> <p>113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.</p> <p>114. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.</p> <p>115. Press the PROCEED button.</p> <p>116. Verify the following events:</p> <p>a. DSKY Register 1 displays a 5 in position 3.</p> <p>b. The FREQUENCY COUNTER is counting.</p> <p>c. DSKY Registers 2 and 3 are blank. Stamp data sheet.</p> <p>117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.</p> <p>118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.</p> <p>119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ± 2 counts in the least significant counter position. Stamp data sheet.</p> | | <p>98. Set the T12 COUNTER STOP switch to the ON position.</p> <p>99. Transfer Control to Location 1354 using the procedures of JDC 05412 (Transfer Control Operating Procedure).</p> <p>100. Press the MONITOR indicator switch to the on (illuminated) position.</p> <p>101. Press the CL Key.</p> <p>102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.</p> <p>103. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.</p> <p>104. Press the PROCEED button.</p> <p>105. Verify the following events:</p> <p>a. DSKY Register 1 displays a 4 in position 3.</p> <p>b. The FREQUENCY COUNTER is counting.</p> <p>c. DSKY Registers 2 and 3 are blank. Stamp data sheet.</p> <p>106. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.</p> <p>107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.</p> <p>108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ± 2 counts in the least significant counter position. Stamp data sheet.</p> |

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| <p>TTEST10 AND 11 - PROGRAM ANALYSIS</p> <p>TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10.23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 6 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (Location 3, 1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (Location 3, 1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.</p> <p>a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (Location 0031).</p> <p>b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.</p> <p>c. Sets a Positive Full Scale number into the TIME 7 Counter and CCS loops TIME 3 sampling for an increment back to zero.</p> | | <p>d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).</p> <p>e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.</p> <p>f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239.06 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position.</p> <p>120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.</p> <p>121. Set the T12 COUNTER STOP switch to the ON position.</p> <p>122. Transfer Control to E Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).</p> <p>123. Press the MONITOR indicator switch to the on (illuminated) position.</p> <p>124. Press the CL Key.</p> <p>125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.</p> <p>126. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.</p> <p>127. Press the PROCEED button.</p> |

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| <p>128. Verify the following events:</p> <p>a. DSKY Register 1 displays a 6 in position 3.</p> <p>b. The FREQUENCY COUNTER is counting.</p> <p>c. DSKY Registers 2 and 3 are blank. Stamp data sheet.</p> <p>129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.</p> <p>130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.</p> <p>131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239.06 milliseconds within ± 2 counts in the least significant counter position. Stamp data sheet.</p> <p>132. Set the T12 COUNTER STOP switch to the ON position.</p> <p>133. Transfer Control to E Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).</p> <p>134. Press the MONITOR indicator switch to the on (illuminated) position.</p> <p>135. Press the CL Key.</p> <p>136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.</p> <p>137. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.</p> <p>138. Press the PROCEED button.</p> | | <p>139. Verify the following events:</p> <p>a. DSKY Register 1 displays a 6 in position 3.</p> <p>b. The FREQUENCY COUNTER is counting.</p> <p>c. DSKY Registers 2 and 3 are blank. Stamp data sheet.</p> <p>140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.</p> <p>141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.</p> <p>142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239.06 within ± 2 counts in the least significant counter position. Stamp data sheet.</p> <p>TTEST12 - PROGRAM ANALYSIS</p> <p>TTEST12 measures the amount of time elapsed between the incrementing of TIME 3 and TIME 4. The programmed functions of the test routine are executed in the order described below.</p> <p>a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.</p> <p>b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.</p> <p>c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).</p> |

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| | d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition. | | 152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet. |
| | e. Stops the external counter immediately after TIME 4 switches to zero, and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position. | | 153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3. Stamp data sheet. |
| | 143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first μs position. | | 154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ± 2 counts in the least significant counter position. Stamp data sheet. |
| | 144. Set the T12 COUNTER STOP switch to the ON position. | | TTEST13 - PROGRAM ANALYSIS |
| | 145. Transfer Control to E Bank 3, location 1423 using the procedure of JDC 05412 (Transfer Control Operating Procedure). | | TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below. |
| | 146. Press the MONITOR indicator switch to the on (illuminated) position. | | a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4. |
| | 147. Press the CL Key. | | b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition. |
| | 148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed. | | c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER). |
| | 149. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position. | | d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition. |
| | 150. Press the PROCEED button. | | e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position. |
| | 151. Verify the following events: | | |
| | a. DSKY Register 1 displays 3-4 in positions 2 through 4. | | |
| | b. The FREQUENCY COUNTER is counting. | | |
| | c. DSKY Registers 2 and 3 are blank. Stamp data sheet. | | |

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|-----------|--|------|--|
| | 155. Set the T12 COUNTER STOP switch to the ON position. | | TTEST14 - PROGRAM ANALYSIS |
| | 156. Transfer Control to E Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure). | | TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below. |
| | 157. Press the MONITOR indicator switch to the on (illuminated) position. | | a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4. |
| | 158. Press the CL Key. | | b. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition. |
| | 159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed. | | c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER). |
| | 160. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position. | | d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition. |
| | 161. Press the PROCEED button. | | e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position. |
| | 162. Verify the following events: | | f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position. |
| | a. DSKY Register 1 displays 3-5 in positions 2 through 4. | | |
| | b. The FREQUENCY COUNTER is counting. | | |
| | c. DSKY Registers 2 and 3 are blank. Stamp data sheet. | | |
| | 163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet. | | 166. Set the T12 COUNTER STOP switch to the ON position. |
| | 164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet. | | 167. Transfer Control to E Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure). |
| | 165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ± 2 counts in the least significant counter position. Stamp data sheet. | | 168. Press the MONITOR indicator switch to the on (illuminated) position. |
| | | | 169. Press the CL Key. |

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|-----------|--|------|--|
| | 170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed. | | b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition. |
| | 171. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position. | | c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER). |
| | 172. Press the PROCEED button. | | d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition. |
| | 173. Verify the following events: | | e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position. |
| | a. DSKY Register 1 displays 4-1 in positions 2 through 4. | | |
| | b. The FREQUENCY COUNTER is counting. | | |
| | c. DSKY Registers 2 and 3 are blank. Stamp data sheet. | | |
| | 174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet. | | 177. Set the T12 COUNTER STOP switch to the ON position. |
| | 175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet. | | 178. Transfer Control to E Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure). |
| | 176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ± 2 counts in the least significant counter position. Stamp data sheet. | | 179. Press the MONITOR indicator switch to the on (illuminated) position. |
| | TTEST15 - PROGRAM ANALYSIS | | 180. Press the CL Key. |
| | TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below. | | 181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed. |
| | a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4. | | 182. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position. |
| | | | 183. Press the PROCEED button. |

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| SUBSYSTEM | Computer | ASSY | Block II - C Computer |
|-----------|--|------|---|
| | 184. Verify the following events: | | d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter. |
| | a. DSKY Register 1 displays 4-2 in positions 2 through 4. | | |
| | b. The FREQUENCY COUNTER is counting. | | e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter. |
| | c. DSKY Registers 2 and 3 are blank. Stamp data sheet. | | f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position. |
| | 185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet. | | 188. Set the T12 COUNTER STOP switch to the ON position. |
| | 186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet. | | 189. Transfer Control to E Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure). |
| | 187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ± 2 counts in the least significant counter position. Stamp data sheet. | | 190. Press the MONITOR indicator switch to the on (illuminated) position. |
| | TTEST16 - PROGRAM ANALYSIS | | 191. Press the CL Key. |
| | TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below. | | 192. Set the FREQ-TIME switch on Frequency Counter to second μs position. Press the RESET button on the Frequency Counter and verify that the display is zeroed. |
| | a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4. | | 193. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position. |
| | b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rpt (Bit 16 of Channel 13). | | 194. Press the PROCEED button. |
| | c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition. | | 195. Verify the following events: |
| | | | a. DSKY Register 1 displays 3-6 in positions 2 through 4. |
| | | | b. The FREQUENCY COUNTER is counting. |

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c. DSKY Registers 1 and 3 are blank.
 Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 micro-seconds within 42 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of any of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.)

After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test # (1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8- "test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

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Table 1. Alarm Test Specifications

| Check No. | R1 Display | R2 (Y)* | R3 (Z) | Initial Warning State | End Expected Warning State |
|-----------|------------|---------|--------|-----------------------|----------------------------|
| 1 | 8-1 | 3.00 | 60 | OFF | OFF |
| 2 | 8-2 | 2.00 | 60 | OFF | OFF or ON |
| 3 | 8-3 | 1.00 | 12 | OFF | accepted |
| 4 | 8-4 | 0.16 | 1 | OFF | ON |
| 5 | 8-5 | 0.50 | 60 | ON | ON |
| 6 | 8-6 | 1.00 | 60 | ON | ON |
| 7 | 8-7 | 2.00 | 60 | ON | OFF or ON |
| 8 | 8-8 | 3.00 | 60 | ON | OFF |

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to E Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

| Register | Display |
|----------|---------|
| 1 | 8-1 |
| 2 | 00300 |
| 3 | 00060 |

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

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208. Verify that the DSKY Registers display the following:

| Register | Display |
|----------|---------|
| 1 | 8-2 |
| 2 | 00200 |
| 3 | 00060 |

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

| Register | Display |
|----------|---------|
| 1 | 8-3 |
| 2 | 00100 |
| 3 | 00012 |

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

| Register | Display |
|----------|---------|
| 1 | 8-4 |
| 2 | 00016 |
| 3 | 00001 |

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

| Register | Display |
|----------|---------|
| 1 | 8-5 |
| 2 | 00050 |
| 3 | 00060 |

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

| Register | Display |
|----------|---------|
| 1 | 8-6 |
| 2 | 00100 |
| 3 | 00060 |

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

| Register | Display |
|----------|---------|
| 1 | 8-7 |
| 2 | 00200 |
| 3 | 00060 |

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222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with 8-7 still displayed in DSKY Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

| Register | Display |
|----------|---------|
| 1 | 8-8 |
| 2 | 00300 |
| 3 | 00060 |

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

| Register | Display |
|----------|---------|
| 1 | 8-8 |
| 2 | 99999 |
| 3 | 99999 |

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

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EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. F
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

| ASSEMBLY UNDER TEST | | | TEST HISTORY | | |
|--------------------------------|----------|----------|------------------|-----------------|-----|
| TITLE | DATE | START | END | SITE / LOCATION | |
| SER. NO. | DWG | REV | TIME | START | END |
| MAJOR GROUND SUPPORT EQUIPMENT | | | TOTAL ELAPSED | | |
| NAME | SER. NO. | CAL DATE | | | |
| NAME | SER. NO. | CAL DATE | | | |
| CONDUCTED BY | | | APPROVED BY | | |
| NAME/AFFILIATION | | | NAME/AFFILIATION | | |

| Step | Parameter | Specification | Results |
|------|--|---|---------|
| 18. | TTEST4 - Ready for Standby | FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank. | |
| 21. | TTEST4 - Amount of time spent in Standby | Computer operated in the Standby mode for a period of | |
| 22. | TTEST4 - Out of Standby | DSKY STBY indicator extinguishes. DSKY PRO (STBY) Key depressed NMT three times. | |
| 28. | TTEST4 - Measurement | FREQUENCY COUNTER totals | |
| 29. | TTEST4 - DSKY Display - Calculations | Registers 2 and 3 displays DSKY NUM/32 | |
| 31. | TTEST4 - Evaluation | The data recorded in step 28 agrees with the results of the Calculation of step 29 within ± 0.2 milliseconds. | |
| 39. | TTEST1 - Start Check | DSKY Register 1 is 24-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |

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EQUIPMENT TEST
DATA SHEET 2 OF 8

JDC
NO. 05773
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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

| Step | Parameter | Specification | Results |
|------|------------------------|---|---------|
| 40. | TTEST1 - Measurement | FREQUENCY COUNTER totals | |
| 41. | TTEST1 - DSKY Displays | 5120 | |
| 42. | TTEST1 - Evaluation | Results in steps 40 and 41 are within ± 2 counts in the least significant counter position. | |
| 50. | TTEST2 - Start Check | DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 51. | TTEST2 - Measurement | FREQUENCY COUNTER totals | |
| 52. | TTEST2 - DSKY Displays | 00010 | |
| 53. | TTEST2 - Evaluation | Results in steps 51 and 52 are within ± 2 counts in the least significant counter position. | |
| 61. | TTEST3 - Start Check | DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 62. | TTEST3 - Measurement | FREQUENCY COUNTER totals | |
| 63. | TTEST3 - DSKY Displays | 5120 | |
| 64. | TTEST3 - Evaluation | Results in steps 62 and 63 are within ± 2 counts in the least significant counter position. | |

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EQUIPMENT TEST
DATA SHEET 3 OF 8

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NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

| Step | Parameter | Specification | Results |
|------|------------------------|---|---------|
| 72. | TTEST5 - Start Check | DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 73. | TTEST5 - Measurement | FREQUENCY COUNTER totals | |
| 74. | TTEST5 - DSKY Displays | Reg. 2 = 16383, Reg. 3 = 00000 | |
| 75. | TTEST5 - Evaluation | Results in steps 73 and 74 are within ± 2 counts in the least significant counter position. | |
| 83. | TTEST6 - Start Check | DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 84. | TTEST6 - Measurement | FREQUENCY COUNTER totals | |
| 85. | TTEST6 - DSKY Displays | Reg. 2 = 16383, Reg. 3 = 00000 | |
| 86. | TTEST6 - Evaluation | Results in steps 84 and 85 are within ± 2 counts in the least significant counter position. | |
| 94. | TTEST7 - Start Check | DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 95. | TTEST7 - Measurement | FREQUENCY COUNTER totals | |

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EQUIPMENT TEST
DATA SHEET 4 OF 8

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NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

| Step | Parameter | Specification | Results |
|------|------------------------|---|---------|
| 96. | TTEST7 - DSKY Displays | Reg. 2 = 16383, Reg. 3 = 00000 | |
| 97. | TTEST7 - Evaluation | Results in steps 95 and 96 are within ± 2 counts in the least significant counter position. | |
| 105. | TTEST8 - Start Check | DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 106. | TTEST8 - Measurement | FREQUENCY COUNTER totals | |
| 107. | TTEST8 - DSKY Displays | Reg. 2 = 16383, Reg. 3 = 00000 | |
| 108. | TTEST8 - Evaluation | Results in steps 106 and 107 are within ± 2 counts in the least significant counter position. | |
| 116. | TTEST9 - Start Check | DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 117. | TTEST9 - Measurement | FREQUENCY COUNTER totals | |
| 118. | TTEST9 - DSKY Displays | Reg. 2 = 16383, Reg. 3 = 00000 | |
| 119. | TTEST9 - Evaluation | Results in steps 117 and 118 are within ± 2 counts in the least significant counter position. | |

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EQUIPMENT TEST
DATA SHEET 5 OF 8

JDC
NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

| Step | Parameter | Specification | Results |
|------|-------------------------|---|---------|
| 128. | TTEST10 - Start Check | DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 129. | TTEST10 - Measurement | FREQUENCY COUNTER totals | |
| 130. | TTEST10 - DSKY Displays | Reg. 2 = 10239, Reg. 3 = 06000 | |
| 131. | TTEST10 - Evaluation | Results in steps 129 and 130 are within ± 2 counts in the least significant counter position. | |
| 139. | TTEST11 - Start Check | DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 140. | TTEST11 - Measurement | FREQUENCY COUNTER totals | |
| 141. | TTEST11 - DSKY Displays | Reg. 2 = 10239, Reg. 3 = 06000 | |
| 142. | TTEST11 - Evaluation | Results in steps 140 and 141 are within ± 2 counts in the least significant counter position. | |
| 151. | TTEST12 - Start Check | DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 152. | TTEST12 - Measurement | FREQUENCY COUNTER totals | |

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EQUIPMENT TEST
DATA SHEET 6 OF 8

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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

| Step | Parameter | Specification | Results |
|------|-------------------------|---|---------|
| 153. | TTEST12 - DSKY Displays | Reg. 2 = 07500, Reg. 3 = 00000 | |
| 154. | TTEST12 - Evaluation | Results in steps 152 and 153 are within ± 2 counts in the least significant counter position. | |
| 162. | TTEST13 - Start Check | DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 163. | TTEST13 - Measurement | FREQUENCY COUNTER totals | |
| 164. | TTEST13 - DSKY Displays | Reg. 2 = 05000, Reg. 3 = 00000 | |
| 165. | TTEST13 - Evaluation | Results in steps 163 and 164 are within ± 2 counts in the least significant counter position. | |
| 173. | TTEST14 - Start Check | DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 174. | TTEST14 - Measurement | FREQUENCY COUNTER totals | |
| 175. | TTEST14 - DSKY Displays | Reg. 2 = 02500, Reg. 3 = 00000 | |
| 176. | TTEST14 - Evaluation | Results in steps 174 and 175 are within ± 2 counts in the least significant counter position. | |

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| Step | Parameter | Specification | Results |
|------|-------------------------|---|---------|
| 184. | TTEST15 - Start Check | DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 185. | TTEST15 - Measurement | FREQUENCY COUNTER totals | |
| 186. | TTEST15 - DSKY Displays | Reg. 2 = 02500, Reg. 3 = 00000 | |
| 187. | TTEST15 - Evaluation | Results in steps 185 and 186 are within ± 2 counts in the least significant counter position. | |
| 195. | TTEST16 - Start Check | DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank. | |
| 196. | TTEST16 - Measurement | FREQUENCY COUNTER totals | |
| 197. | TTEST16 - DSKY Displays | Reg. 2 = 03125, Reg. 3 = 00000 | |
| 198. | TTEST16 - Evaluation | Results in steps 196 and 197 are within ± 2 counts in the least significant counter position. | |
| 207. | WTEST Check No. 1 | DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank. | |
| 210. | WTEST Check No. 2 | DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank. | |

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| Step | Parameter | Specification | Results |
|------|----------------------------|--|---------|
| 212. | WTEST Check No. 3 | DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank. | |
| 213. | WTEST Check No. 4 | DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively. | |
| 216. | WTEST Check No. 5 | DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank. | |
| 220. | WTEST Check No. 6 | DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on. | |
| 223. | WTEST Check No. 7 | DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank. | |
| 228. | WTEST8 and Success Display | DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999. | |

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